KRAMER

USER MANUAL

MODEL:

DSP-1
Digital Sound Processor

P/N: 2900-301163 Rev 1

Contents

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!

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 www.kramerav.com/downloads/DSP-1 to check for up-to-date user manuals, application programs, and to check if firmware upgrades are available (where appropriate).

Achieving 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 **DSP‑1** 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.

Safety Instructions

Caution: There are no operator serviceable parts inside the unit.

Warning: Use only the Kramer Electronics power supply that is provided with the unit.

Warning: Disconnect the power and unplug the unit from the wall before installing.

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 www.kramerav.com/support/recycling.

Overview

Congratulations on purchasing your Kramer **DSP-1 Digital Sound Processor**.
DSP-1 enables the control of individual volume per input, 3-band parametric EQ, selectable HPF (High-Pass Filters) at 70Hz and master volume via IP. **DSP-1** is a small form factor and cost-effective solution suitable for a range of audio applications.

DSP-1 provides exceptional quality and advanced and user-friendly operation and control:

- 2-Input mixing with master volume.
- Hi-Pass Filter – Selectable HPF at 70Hz.
- Professional, Studio Grade Signal Conversion Technology – Includes the latest generation 32-bit advanced Digital Analog Converter architecture to achieve excellent dynamic performance and improved tolerance to clock jitter. Maintains the quality of the original audio signal with selectable sampling rates up to 96kHz.
- 3-Band Parametric Equalizer – Frequency, Q-factor & gain control per band.
- Line-Level amplifier for audio gain and attenuation.
- Creates & saves presets.
- Highly cost effective.

Controlling your DSP-1

Control your **DSP-1** via:

- RS-232 serial commands transmitted by a touch screen system, PC, or other serial controller.
- The Ethernet using built-in user-friendly Web pages.

Installing your DSP-1

Install **DSP-1** using one of the following methods:

- Attach the rubber feet and place the unit on a flat surface.
- Fasten a bracket (included) on each side of the unit and attach it to a flat surface. For more information go to www.kramerav.com/downloads/DSP-1.
- Mount the unit in a rack using the recommended rack adapter (see www.kramerav.com/product/DSP-1).

Typical Applications

DSP-1 is ideal for the following typical applications:

- Classrooms or educational facilities
- Meeting rooms
- Huddle spaces
- Auditoriums

Defining DSP‑1 Digital Sound Processor

This section defines **DSP‑1**.

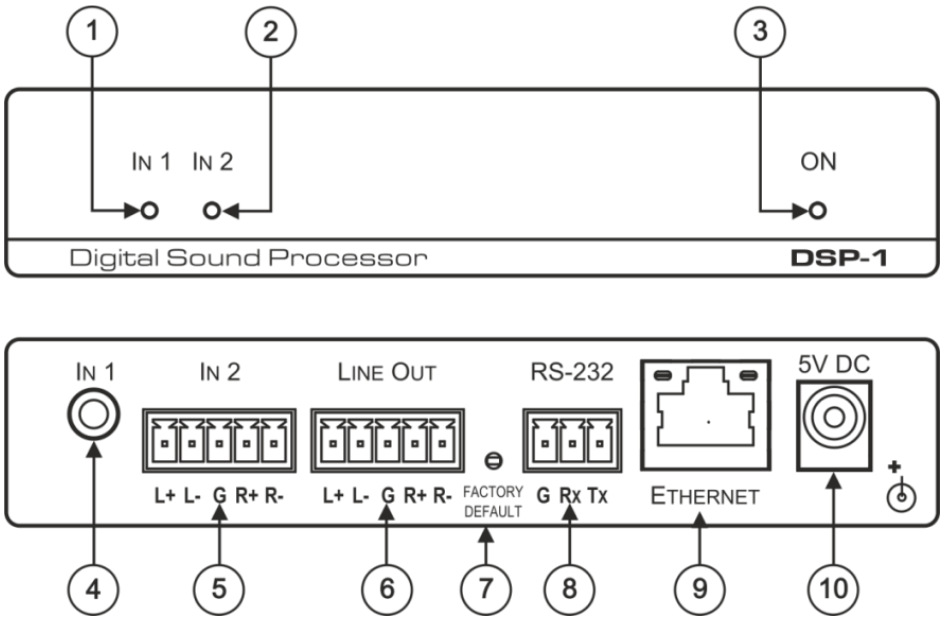


Figure 1: DSP‑1 Digital Sound Processor

#	Feature	Function
1	IN 1 LED	Lights green when a signal is present on IN 1.
2	IN 2 LED	Lights green when a signal is present on IN 2.
3	ON LED	Lights green when the device is powered.
4	IN 1 3.5mm Mini Jack	Connect to an unbalanced stereo audio source.
5	IN 2 5-pin Terminal Block Connector	Connect to a balanced stereo audio source.
6	LINE OUT 5-pin Terminal Block Connector	Connect to a balanced stereo audio acceptor.
7	FACTORY DEFAULT Recessed Button	Press and hold while powering the device to reset IP settings to factory default values.
8	RS-232 (G, Rx, Tx) 3-pin Terminal Block Connector	Connect to a PC or a serial controller.
9	ETHERNET RJ-45 Port	Connect to the Ethernet.
10	5V DC	5V DC connector for powering the unit.

Connecting DSP-1

Always switch off the power to each device before connecting it to your **DSP-1**. After connecting your **DSP-1**, connect its power and then switch on the power to each device.

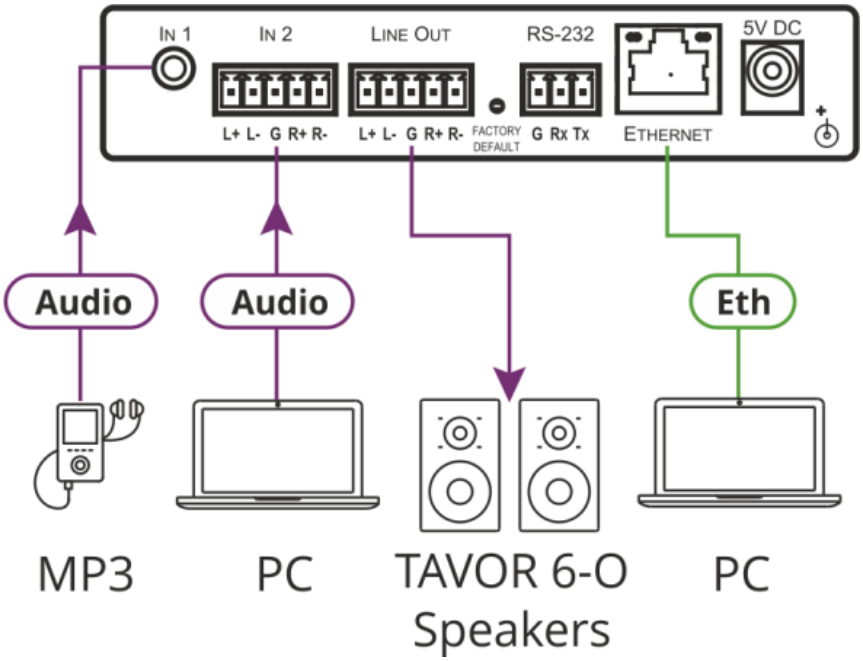


Figure 2: Connecting to the DSP-1 Rear Panel

To connect DSP-1 as illustrated in Figure 2:

1. Connect an unbalanced stereo audio source (for example, an MP3) to the IN 1 3.5mm mini jack (4).
2. Connect a balanced stereo source (for example, from a PC) to the IN 2 5-pin terminal block connector (5).
3. Connect the LINE OUT 5-pin terminal block connector (6) to a balanced stereo audio acceptor (for example, active speakers).
   Connect the left speaker to the “L+” and the “L-” terminal block connectors, and the right speaker to the “R+” and the “R-” terminal block connectors.

   Do not ground the speakers.
4. If required, connect to:
   - A PC or serial controller via the RS-232 3-pin terminal block (8).
   - A PC via the ETHERNET RJ-45 port (9).
5. Connect the 5V DC power connector (10) to the power adapter and plug it to the mains electricity.
   We recommend that you use only the power adapter that is supplied with this machine.

Connecting to DSP-1 via RS-232

You can connect to the **DSP-1** via an RS-232 connection to the RS-232 port (8) using, for example, a PC.

Connect the RS-232 terminal block on the rear panel of the **DSP-1** to a PC/controller, as follows (see Figure 3):

- TX pin to Pin 2.
- RX pin to Pin 3.
- GND pin to Pin 5.

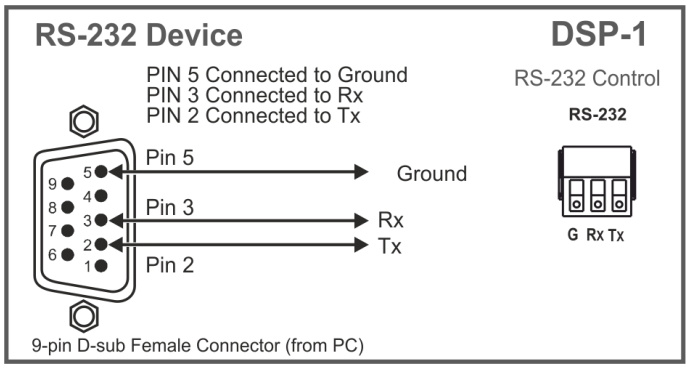


Figure 3: RS-232 Connection

Connecting DSP-1 via the Ethernet Port

You can connect to the **DSP-1** via Ethernet using either of the following methods:

- Connecting the Ethernet Port Directly to a PC on page 6.
- Connecting the Ethernet Port via a Network Hub or Switch on page 8.

If you want to connect via a router and your IT system is based on IPv6, speak to your IT department for specific installation instructions.

Connecting the Ethernet Port Directly to a PC

You can connect the Ethernet port of the **DSP-1** directly to the Ethernet port on your PC using a crossover cable with RJ-45 connectors.

This type of connection is recommended for identifying the **DSP-1** with the factory configured default IP address.

After connecting the **DSP-1** to the Ethernet port, configure your PC as follows:

1. Click **Start** > **Control Panel** > **Network and Sharing Center**.
2. Click **Change Adapter Settings**.
3. Highlight the network adapter you want to use to connect to the device and click **Change settings of this connection**.

The Local Area Connection Properties window for the selected network adapter appears as shown in Figure 4.

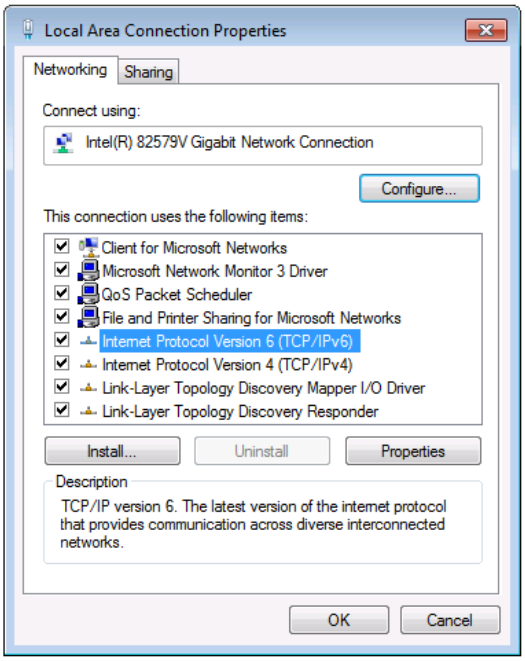


Figure 4: Local Area Connection Properties Window

4. Highlight either **Internet Protocol Version 6 (TCP/IPv6)** or **Internet Protocol Version 4 (TCP/IPv4)** depending on the requirements of your IT system.
5. Click **Properties**.
   The Internet Protocol Properties window relevant to your IT system appears as shown in Figure 5 or Figure 6.

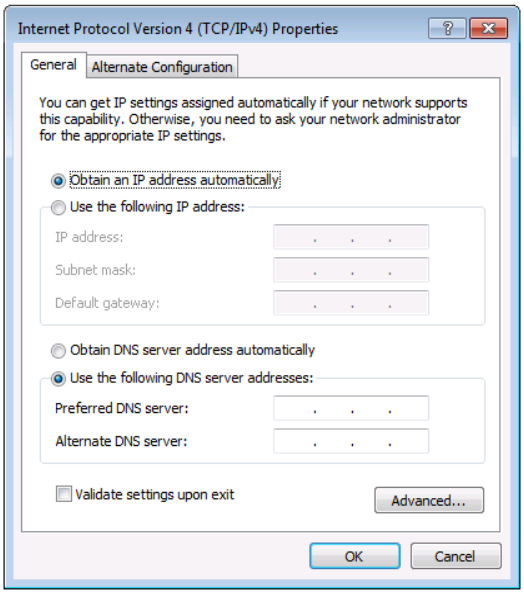


Figure 5: Internet Protocol Version 4 Properties Window

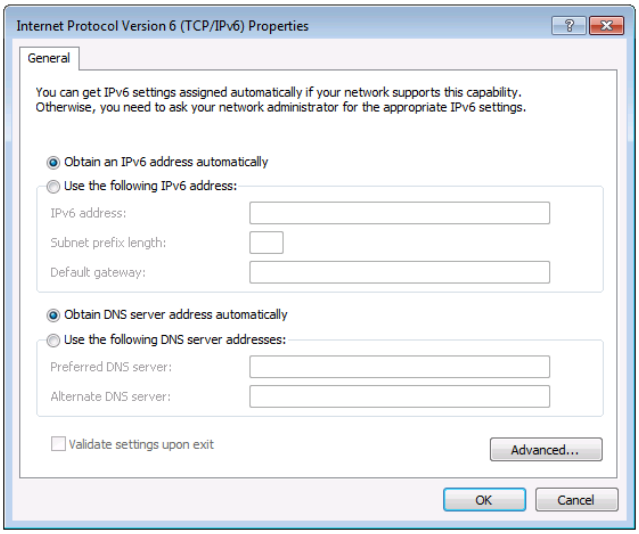


Figure 6: Internet Protocol Version 6 Properties Window

6. Select **Use the following IP Address** for static IP addressing and fill in the details as shown in Figure 7.
   For TCP/IPv4 you can use any IP address in the range 192.168.1.1 to 192.168.1.255 (excluding 192.168.1.39) that is provided by your IT department.

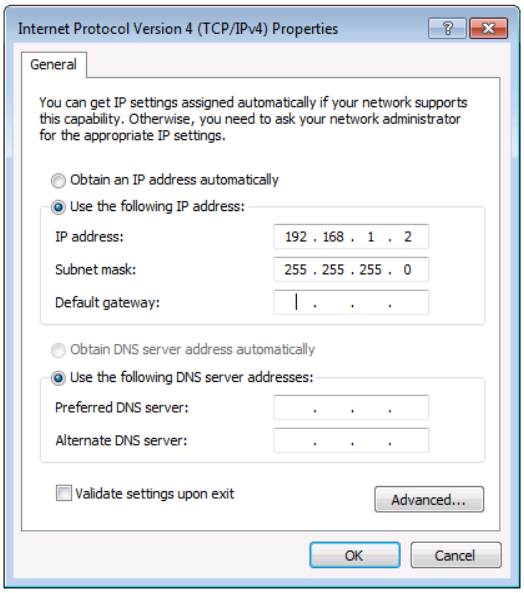


Figure 7: Internet Protocol Properties Window

7. Click **OK**.
8. Click **Close**.

Connecting the Ethernet Port via a Network Hub or Switch

You can connect the Ethernet port of the **DSP-1** to the Ethernet port on a network hub or using a straight-through cable with RJ-45 connectors.

Control Configuration via the Ethernet Port

To control several units via Ethernet, connect the Master unit (Device 1) via the Ethernet port to the Ethernet port of your PC. Use your PC provide initial configuration of the settings (see Connecting DSP-1 via the Ethernet Port on page 6).

Using the Web Pages

- The web pages enable you to control the **DSP-1** via the Ethernet and enable performing the following operations:
- Setting the Audio Output Parameters on page 11.
- Setting Device Parameters on page 12.
- Managing Web Page Security on page 14.
- Viewing the About Page on page 15.

Before attempting to connect:

- Perform the procedures in Connecting DSP-1 via the Ethernet Port on page 6.
- Ensure that your browser is supported.

The following operating systems and Web browsers are supported:

OS	Version	Browser
Windows	7	IE
		Firefox
		Chrome
		Safari
	10	IE
		Edge
		Firefox
		Chrome
Mac	10.11	Safari
iOS	10.3.2	Safari
Android	N/A	N/A

To browse the DSP-1 Web pages:

1. Open your Internet browser.
2. Type the IP address of the device in the address bar of your browser. For example, the default IP address:

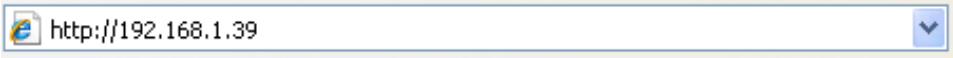


Figure 8: Using the Embedded Web Pages – Default IP Address

If the Web pages are password protected, the Authentication window appears:

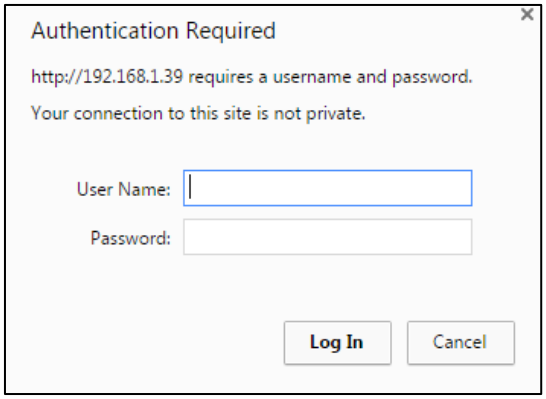


Figure 9: Using the Embedded Web Pages – Authentication Window

3. Enter the **User Name** and **Password** (Admin and Admin by-default) and click **OK**. The Output Settings page appears.

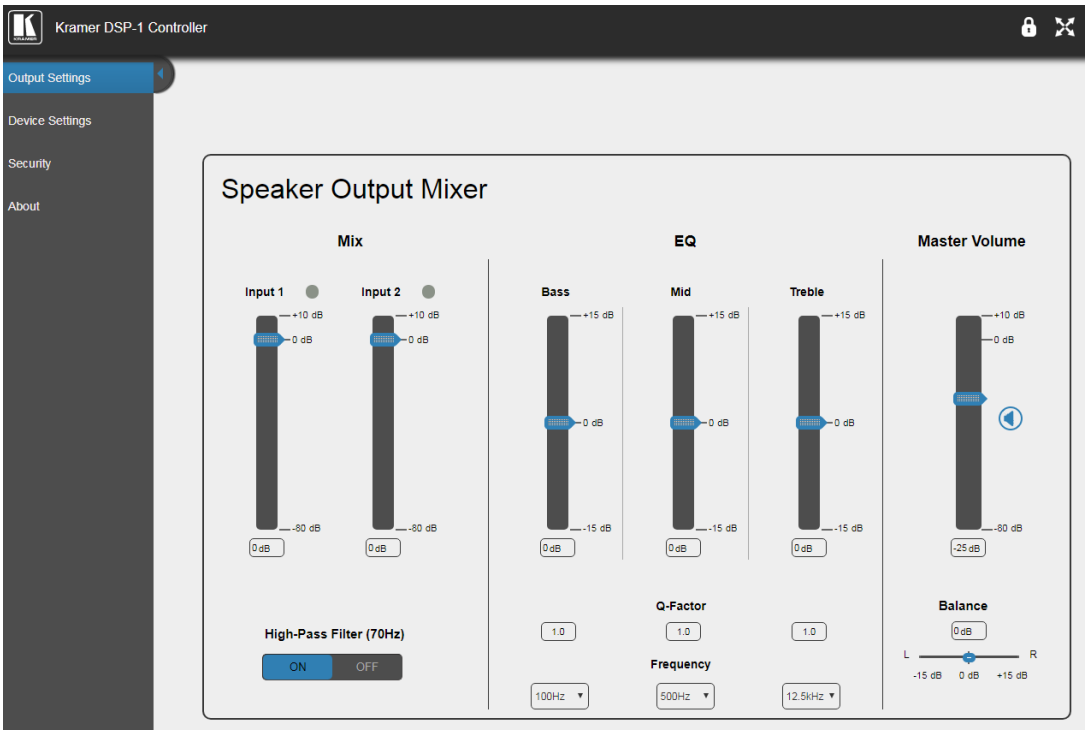


Figure 10: Output Settings Page with Navigation List on Left

4. Click the desired Web page or click the arrow to hide the navigation list.

Setting the Audio Output Parameters

The Speaker Output Mixer enables performing the following operations:

Mixing the Input Signal Levels

The indication buttons next to Input 1 and Input 2 appear green when there is an active signal on that input.

To set the Mixing Level:

1. In the Navigation pane, click **Output Settings**.
   The Speaker Output Mixer page appears (see Figure 10).
2. In the Mix column, use the slides to set the mixing level for each input or enter their value below the slides.
3. Set the High-Pass Filter **ON** or **OFF** to cut off frequencies lower than 70Hz.

To save energy, enable the High-Pass Filter when outputting soft background music or speech sources.

Setting Equalization Levels

We recommend that you first set the frequencies, then the Q and finally the Bass, Mid and Treble ranges.

To set EQ levels:

1. In the navigation pane click **Output Settings**. The Speaker Output Mixer page appears.
2. In the EQ column set the following:
   - Frequency: Bass [60Hz, 80Hz, 100Hz or 200Hz], Mid [500Hz, 1kHz, 1.5kHz or 2.5kHz] and Treble [10kHz, 12.5kHz, 15kHz or 17.5kHz] frequency.
   - Q-Factor: Bass, Mid and Treble [0.1 to 16].
     The lower the Q value, the wider the bandwidth.
   - Equalization: Bass, Mid and Treble via the slides or enter their value [dB] below the slides.

Setting the Master Volume and Balance

In the Master Volume column:

- Use the slide to set the speaker audio level or enter the value [dB] below the slide.
- Click to mute/unmute the output volume.
- Set the left right balance on the speaker output.

Setting Device Parameters

The Device Settings Web page shows the device details, such as name, MAC address and firmware version. It also allows the following functions:

- Changing the name of the unit by typing the name in the Unit name text box and clicking **Set** next to the name.
- Changing the Ethernet Settings on page 12.
- Saving and Loading Settings on page 13.
- Performing a Factory Reset on page 13.

Changing the Ethernet Settings

To change the Ethernet settings, if required:

1. In the Navigation pane, click **Device Settings**. The Device Settings page appears:

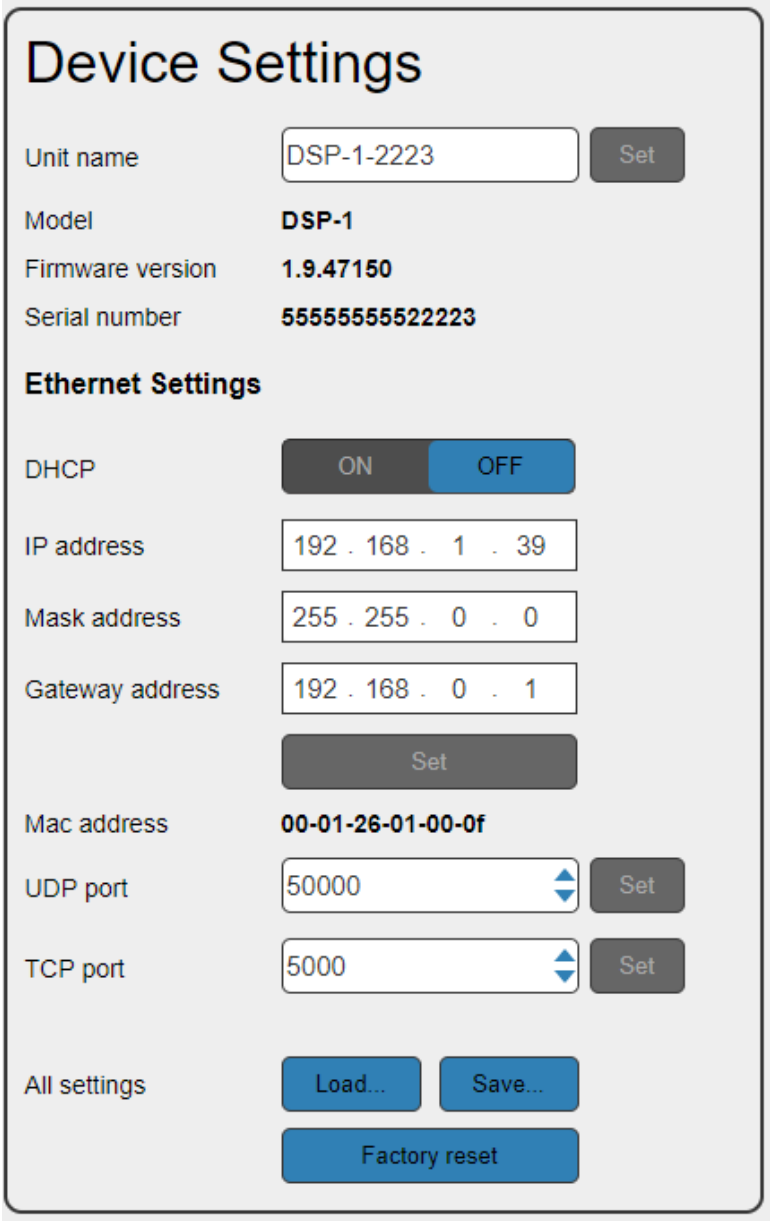


Figure 11: Device Settings Page

2. Set DHCP to **ON** or **OFF**.
3. If DHCP is set to **OFF**, change any of the parameters (IP Address, Netmask and/or Gateway), if required.
4. Click **Set**.

- After changing the IP address, reload the web page with the new IP address.
- After changing the Mask address you need to restart the **DSP-1**.
- If DHCP is checked, reload the web page with the new IP address.

5. Set the UDP and TCP port numbers and click **Set**.

Saving and Loading Settings

To save a configuration:

1. In the Navigation pane, click **Device Settings**.
   The Device Settings page appears (see Figure 11).
2. Click **Save**. The following message appears:
   "Configuration file is ready, right-click here to download".
3. Right-click the link (**right-click here**) and click **Save link as**.
   The configuration is downloaded to your PC.

To load a configuration:

1. In the Navigation pane, click **Device Settings**.
   The Device Settings page appears (see Figure 11).
2. Click **Load** and browse for the configuration file.
3. Click **Open**.
   The configuration loads (this process may take a few minutes to complete).
   A message indicating that the configuration uploaded successfully appears.

Performing a Factory Reset

To reset the device to its factory default values:

1. In the Navigation pane, click **Device Settings**.
   The Device Settings page appears (see Figure 11).
2. Click **Factory reset**.
   A confirmation warning message appears.
3. Click **OK** to start factory reset and follow the instructions on-screen.

Managing Web Page Security

Use the Authentication page to set Web access permission.

To access Web pages without using the password:

1. In the Navigation pane, click **Security**.
   The Authentication page appears (see Figure 12).

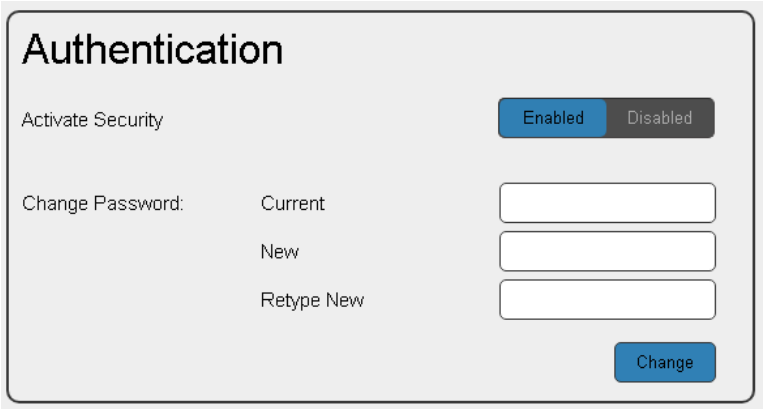


Figure 12: Authentication Page

2. Set Activate Security to **Disabled**.
   A message prompting for your password appears.
3. Type the current password (Admin by default) and click **OK**.
   A message indicating that the password was changed successfully appears.
4. Click **OK**.
   The Web page reloads and the web pages are unlocked .

To access Web pages using the password:

1. In the Navigation pane, click **Security**.
   The Authentication page appears (see Figure 12).
2. Set Activate Security to **Enabled** for Web page password protection.
   A confirmation warning message appears:
3. Click **OK**.
   The connection is interrupted, and authentication is required to access web pages.

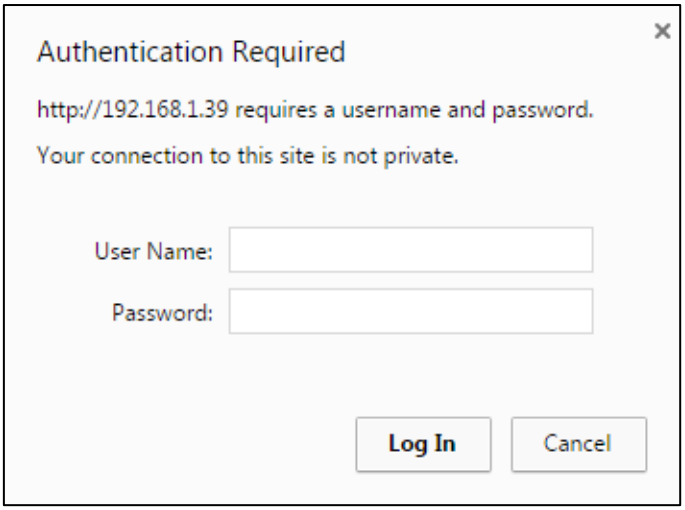


Figure 13: Password Settings Page – Security Log In

4. Type the User Name (Admin, by default) and Password (Admin, by default).
5. Click **Log In**.
6. Select **Security** from the Navigation pane.
   The Authentication page appears (see Figure 12).
7. Type the new authentication password twice in both New and Retype New text boxes.
8. Click **Change**.
   A confirmation warning message appears.
9. Click **OK**. The following message appears.
   A message indicating that the password was changed successfully appears.
10. Click **OK**.

The web pages are locked .

Viewing the About Page

The About page lets you view the web page version and Kramer Electronics Ltd details.

Upgrading the Firmware

You can upgrade the **DSP-1** via the Ethernet or RS-232 using Kramer **K-UPLOAD** tool.

The latest firmware version and the latest version of **K-UPLOAD** and installation instructions can be downloaded from the Kramer Web site at www.kramerav.com/downloads/DSP-1.

Technical Specifications

Inputs	Balanced Stereo Audio	On a 5-pin terminal block connector
	Unbalanced Stereo Audio	On a 3.5mm mini jack
Output	Balanced Stereo Audio	On a 5-pin terminal block connector
Ports	RS-232	On a 3-pin terminal block connector
	Ethernet	On an RJ-45 female connector
Audio	Frequency Response	20Hz to 20kHz, ±0.3dB
	Signal to Noise Ratio	>110dB, 20Hz to 20kHz, at unity gain (unweighted)
	THD+N	<0.01%, 20Hz to 20kHz, at unity gain
	Crosstalk	< -85dB, 20Hz to 20kHz
	Input Impedance	10KΩ
	Output Impedance	150Ω
Supported Web Browsers	Windows 7	Internet Explorer, Firefox, Chrome, Safari
	Windows 10	Internet Explorer, Edge, Firefox, Chrome
	MAC 10.11	Safari
	iOS 10.3.2	Safari
	Android	N/A
Power	Consumption	5V DC, 350mA
	Source	5V DC, 4A
Environmental Conditions	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
Regulatory Compliance	Safety	CE
	Environmental	RoHs, WEEE
Enclosure	Size	Tool
	Type	Aluminum
	Cooling	Convection ventilation
General	Net Dimensions (W, D, H)	12cm x 7.2cm x 2.4cm (4.7" x 2.8" x 0.9")
	Shipping Dimensions (W, D, H)	15.7cm x 12cm x 8.7cm (6.2" x 4.7" x 3.4")
	Net Weight	0.2kg (0.4lbs)
	Shipping Weight	0.6kg (1.3lbs) approx.
Accessories	Included	Power adapter and cord
	Optional	For optimum range and performance use the recommended Kramer cables available at www.kramerav.com/product/DSP-1
Specifications are subject to change without notice at www.kramerav.com		

DSP-1 Performance Graphs

The following graphs present the DSP-1 performance.

DSP-1 Frequency Response

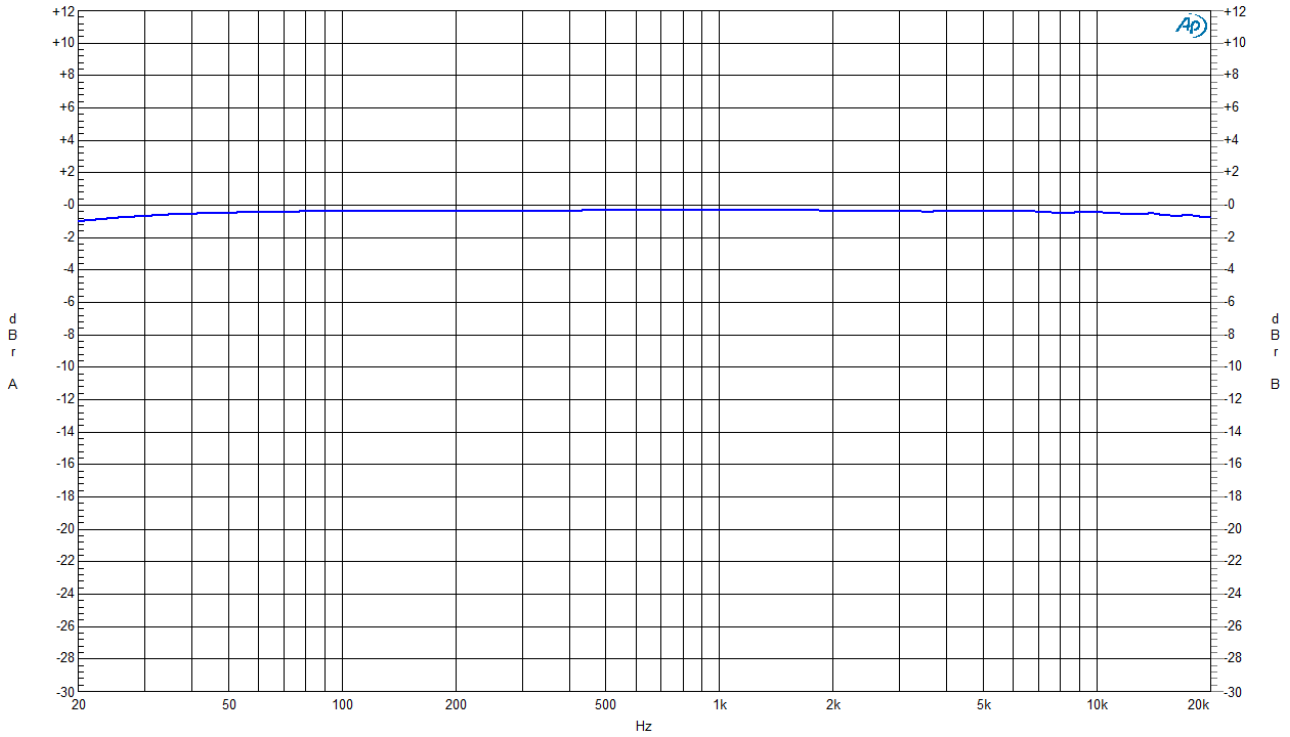


Figure 14: Frequency Response

DSP-1 Signal to Noise Ratio

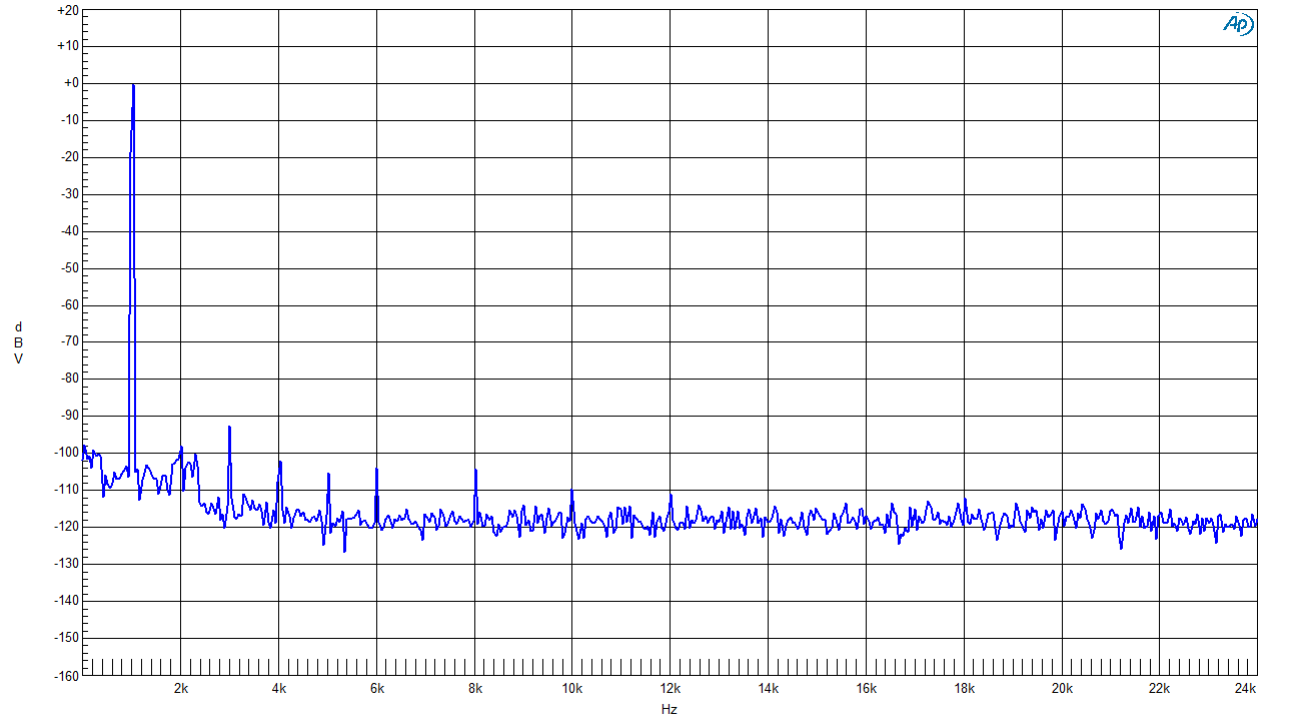


Figure 15: Signal to Noise Ratio

DSP-1 THD + N

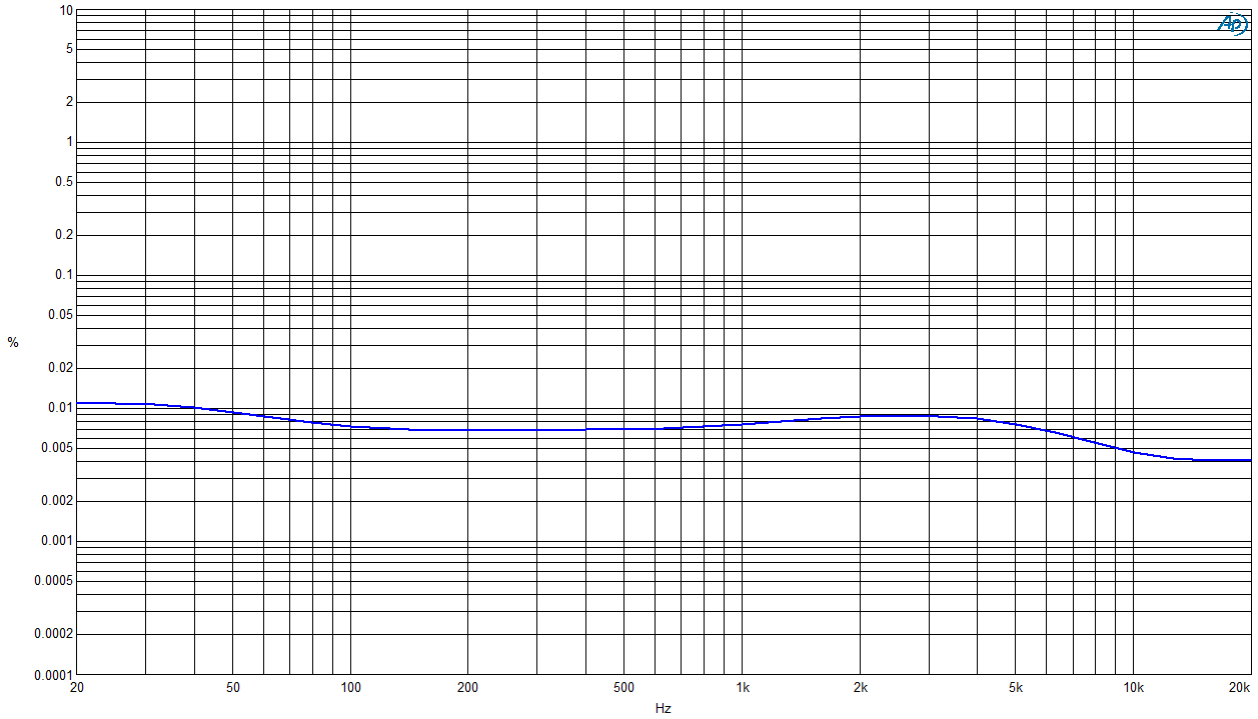


Figure 16: THD + N

DSP-1 Crosstalk

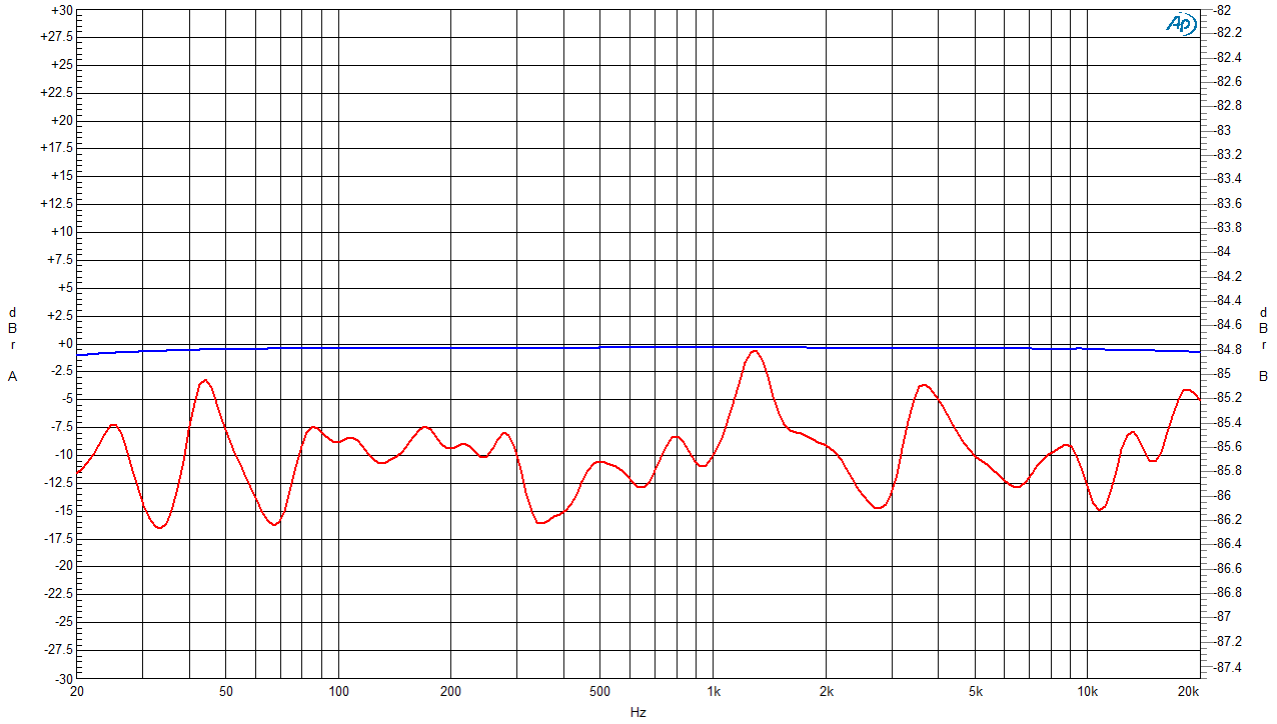


Figure 17: Crosstalk

Default Communication Parameters

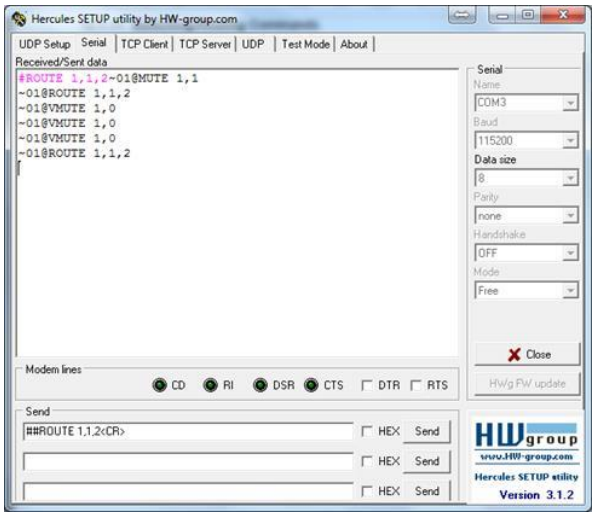
RS-232	
Baud Rate:	115,200
Data Bits:	8
Stop Bits:	1
Parity:	None
Command Format:	ASCII
Example (Change the volume of input 2 to -10 DB):	`#X-AUD-LVL 1,2,-10`
TCP/IP Parameters	
IP Address:	192.168.1.39
Subnet mask:	255.255.000.000
Default gateway:	192.168.0.1
TCP Port #:	5000
Maximum TCP Ports:	Unlimited
UDP Port #:	50000
Maximum UDP Ports:	Unlimited
Default Security Settings	
Username / Password:	Admin / Admin
Full Factory Reset	
Protocol 3000:	Use "`#FACTORY`" command and use "`#RESET`" to restore the factory default values.
Web pages:	Go to: Device Settings-> Factory reset
Rear panel button:	Press and hold **FACTORY DEFAULT** while powering the device to reset IP settings to factory default values.

Protocol 3000

The **DSP-1 Digital Sound Processor** can be operated using the Kramer Protocol 3000 serial commands. The command framing varies according to how you interface with the **DSP-1**.

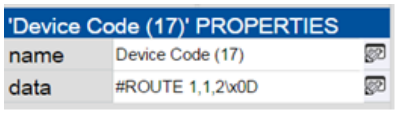
Generally, a basic video input switching command that routes a layer 1 video signal to HDMI out 1 from HDMI input 2 (`ROUTE 1,1,2`), is entered as follows:

- Terminal communication software, such as Hercules:

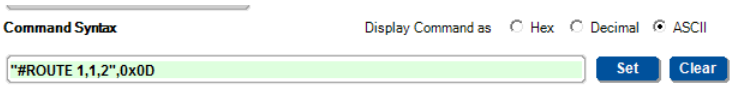


The framing of the command varies according to the terminal communication software.

- K-Touch Builder (Kramer software):



- K-Config (Kramer configuration software):



All the examples provided in this section are based on using the K-Config software.

You can enter commands directly using terminal communication software (e.g., Hercules) by connecting a PC to the serial or Ethernet port, depending on your device. To enter `CR` press the Enter key (`LF` is also sent but is ignored by the command parser).

Commands sent from various non-Kramer controllers (e.g., Crestron) may require special coding for some characters (such as, `/X##`). For more information, refer to your controller's documentation.

For more information about Protocol 3000 commands, see:

- Understanding Protocol 3000 on page 22.
- Kramer Protocol 3000 Syntax on page 23.
- Protocol 3000 Commands on page 24.

Understanding Protocol 3000

Protocol 3000 commands are structured according to the following:

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

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

- Message starting character:
  - # – For host command/query
  - ~ – For device response
- Device address – K-NET Device ID followed by @ (optional, K-NET only)
- Query sign – ? follows some commands to define a query request
- Message closing character:
  - CR – Carriage return for host messages (ASCII 13)
  - CR LF – Carriage return for device messages (ASCII 13) and line-feed (ASCII 10)
- Command chain separator character – 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 at the beginning and end of the string.

Spaces between parameters or command terms are ignored. Commands in the string do not execute until the closing character is entered. A separate response is sent for every command in the chain.

Kramer Protocol 3000 Syntax

The Kramer Protocol 3000 syntax uses the following delimiters:

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

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

The Protocol 3000 syntax is in the following format:

- Host Message Format:

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

- **Simple Command** – Command string with only one command without addressing:

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

- **Command String** – Formal syntax with command concatenation and addressing:

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

- **Device Message Format**:

Start	Address (optional)	Body	Delimiter
~	*Device_id@*	**Message**	CR LF

- Device Long Response – Echoing command:

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

Protocol 3000 Commands

This section includes the following commands:

System Commands

All devices running Protocol 3000 use these commands.

Command	Description
#	Protocol handshaking
BUILD-DATE?	Get device build date
FACTORY	Reset to factory default configuration
HELP	Get command list
MODEL?	Get device model
PROT-VER?	Get device protocol version
RESET	Reset device
SN?	Get device serial number
NAME	Set/get machine (DNS) name

#

Functions		Permission	Transparency
Set:	#	End User	Public
Get:	–	–	–
Description		**Syntax**	
Set:	Protocol handshaking	#CR	
Get:	–	–	
Response			
~nn@SPOKCR LF			
Notes			
Validates the Protocol 3000 connection and gets the machine number Step-in master products use this command to identify the availability of a device			
K-Config Example			
"#",0x0D			

BUILD-DATE?

Functions		Permission	Transparency
Set:	–	–	–
Get:	**BUILD-DATE?**	End User	Public
Description		**Syntax**	
Set:	–	–	
Get:	Get device build date	**#BUILD-DATE?**CR	
Response			
~nn@**BUILD-DATE**SP*date*SP*time*CR LF			
Parameters			
date – Format: YYYY/MM/DD where YYYY = Year, MM = Month, DD = Day *time* – Format: hh:mm:ss where hh = hours, mm = minutes, ss = seconds			
K-Config Example			
"#BUILD-DATE?",0x0D			

FACTORY

Functions		Permission	Transparency
Set:	**FACTORY**	End User	Public
Get:	–	–	–
Description		**Syntax**	
Set:	Reset device to factory default configuration	**#FACTORY**CR	
Get:	–	–	
Response			
~nn@**FACTORY**SP*OK*CR LF			
Notes			
This command deletes all user data from the device. The deletion can take some time. Your device may require powering off and powering on for the changes to take effect.			
K-Config Example			
"#FACTORY",0x0D			

HELP

Functions		Permission	Transparency
Set:	–	–	–
Get:	**HELP**	End User	Public
Description		**Syntax**	
Set:	–	–	
Get:	Get command list or help for specific command	2 options: 1. **#HELP**CR 2. **#HELP**SP*command_name*CR	
Response			
1. Multi-line: ~nn@Device available protocol 3000 commands:CR LF*command,*SP*command…*CR LF To get help for command use: HELP (COMMAND_NAME)CR LF 2. Multi-line: ~nn@**HELP**SP*command:*CR LF*description*CR LF USAGE:*usage*CR LF			
Notes			
To get help for a specific command use: HELPSPCOMMAND_NAMECR LF			
K-Config Example			
"#HELP",0x0D			

MODEL?

Functions		Permission	Transparency
Set:	–	–	–
Get:	**MODEL?**	End User	Public
Description		**Syntax**	
Set:	–	–	
Get:	Get device model	**#MODEL?**CR	
Response			
~nn**@MODEL**SP*model_name*CR LF			
Parameters			
model_name – string of up to 19 printable ASCII chars			
Notes			
This command identifies equipment connected to Step-in master products and notifies of identity changes to the connected equipment. The Matrix saves this data in memory to answer REMOTE-INFO requests			
K-Config Example			
"#MODEL?",0x0D			

PROT-VER?

Functions		Permission	Transparency
Set:	–	–	–
Get:	**PROT-VER?**	End User	Public
Description		**Syntax**	
Set:	–	–	
Get:	Get device protocol version	**#PROT-VER?**CR	
Response			
~nn**@PROT-VER**SP*3000:version*CR LF			
Parameters			
version – XX.XX where X is a decimal digit			
K-Config Example			
"#PROT-VER?",0x0D			

RESET

Functions		Permission	Transparency
Set:	**RESET**	Administrator	Public
Get:	–	–	–
Description		**Syntax**	
Set:	Reset device	**#RESET**CR	
Get:	–	–	
Response			
~nn**@RESET**SP*OK*CR LF			
Notes			
To avoid locking the port due to a USB bug in Windows, disconnect USB connections immediately after running this command. If the port was locked, disconnect and reconnect the cable to reopen the port.			
K-Config Example			
"#RESET",0x0D			

SN?

Functions		Permission	Transparency
Set:	–	–	–
Get:	**SN?**	End User	Public
Description		**Syntax**	
Set:	–	–	
Get:	Get device serial number	**#SN?**CR	
Response			
~nn**@SN**SP*serial_number*CR LF			
Parameters			
serial_number – 14 decimal digits, factory assigned			
K-Config Example			
"#SN?",0x0D			

NAME

Functions		Permission	Transparency
Set:	**NAME**	Administrator	Public
Get:	**NAME?**	End User	Public
Description		**Syntax**	
Set:	Set machine (DNS) name	**#NAME**SP*machine_name*CR	
Get:	Get machine (DNS) name	**#NAME?**CR	
Response			
Set: ~nn**@NAME**SP*machine_name*CR LF Get: ~nn**@NAME?**SP*machine_name*CR LF			
Parameters			
machine_name – string of up to 15 alpha-numeric chars (can include hyphen, not at the beginning or end)			
Notes			
The machine name is not the same as the model name. The machine name is used to identify a specific machine or a network in use (with DNS feature on)			
K-Config Example			
Set the DNS name of the device to "room-442": "#NAME room-442",0x0D			

Audio Commands

These commands are used by audio devices running Protocol 3000.

Command	Description
AUD-CH-LINK	Set/get link between master configuration and slave/state
AUD-CLIP?	Get clipping status
AUD-FILTER	Set/get filter/state
AUD-HI-Z?	Get High Z status
AUD-IN-CONF	Set/get threshold and time
AUD-LVL	Set/get audio level in specific amplifier stage
AUD-MIX	Set/get mixer level
AUD-MONO-MODE	Set/get output select state when audio in HI-Z mode only
AUD-SIGNAL?	Get audio input signal status
AUD-STANDBY	Set/get standby mode/state
BALANCE	Set/get balance level
EQ-FREQ	Set/get equalizer center
EQ-LVL	Set/get equalization level
EQ-Q	Set/get Q level
MUTE	Set/get audio mute

AUD-CH-LINK

Functions		Permission	Transparency
Set:	**AUD-CH-LINK**	End User	Public
Get	**AUD-CH-LINK?**	End User	Public
Description		**Syntax**	
Set:	Set link between master configuration and slave	**#AUD-CH-LINK**SP*Ch1*,*Ch2*,*LinkState*CR	
Get:	Get the configuration link state	**#AUD-CH-LINK?***Ch1*CR	
Response			
~nn**@AUD-CH-LINK**SP*Ch1*,*Ch2*,*LinkState*CR LF			
Parameters			
Ch1 – 1 (Speaker Output) *Ch2* – 2 (Line Level Output) *LinkState* – 1 (enable), 0 (disable)			
Notes			
Response if no link - AUD-CH-LINK 1,1,0 Response if link - AUD-CH-LINK 1,2,1			
K-Config Example			
Set a link between the speaker output configuration and the line level output configuration: "#AUD-CH-LINK 1,2,1",0x0D			

AUD-CLIP?

Functions		Permission	Transparency
Set:	–	–	–
Get	**AUD-CLIP?**	End User	Public
Description		**Syntax**	
Set:	–	–	
Get:	Get clipping status	**#AUD-CLIP?**SP*Channel*CR	
Response			
~nn**@AUD-CLIP**SP*Channel*,*ClipStatus*CR LF			
Parameters			
Channel – 1 (Speaker Output), 2 (Line Level Output) *ClipStatus* – 1 (Clipping detected), 0 (Clipping not detected)			
K-Config Example			
Get the speaker output channel clipping status: "#AUD-CLIP? 1",0x0D			

AUD-FILTER

Functions		Permission	Transparency
Set:	**AUD-FILTER**	End User	Public
Get	**AUD-FILTER?**	End User	Public
Description		**Syntax**	
Set:	Set filter	**#AUD-FILTER**SP*Channel*,*FilterType*,*Freq*,*State*CR	
Get:	Get filter state	**#AUD-FILTER?**SP*Channel*CR	
Response			
~nn**@AUD-FILTER**SP*Channel*,*FilterType*,*Freq*,*State*CR LF			
Parameters			
Channel – 1 (Speaker Output), 2 (Line Level Output) *FilterType* – Filter type: 0 (High pass filter) *Freq* – Filter frequency: 0 (T: 10kHz, M: 500Hz, B: 60Hz), 1 (T: 12.5kHz, M: 1kHz, B: 80Hz), 2 (T: 15kHz, M: 1.5kHz, B: 500Hz), 3 (T: 17.5kHz, M: 2.5kHz, B: 200Hz) *State* – 1 (On), 0 (Off)			
Notes			
T=Treble, M=Middle, B=Bass			
K-Config Example			
Set the audio filter on the speaker output on to high-pass filter, T: 10kHz, M: 500Hz, B: 60Hz: "#AUD-FILTER 1,0,0,1",0x0D			

AUD-HI-Z

Functions		Permission	Transparency
Set:	–	–	–
Get	**AUD-HI-Z?**	End User	Public
Description		**Syntax**	
Set:	–	–	
Get:	Get High Z status	**#AUD-HI-Z?**CR	
Response			
~nn**@AUD-HI-Z**SP*Channel*,*HiZState*,*HiZVolt*CR LF			
Parameters			
Channel – 1 (Speaker Output), 2 (Line Level Output) *HiZState* – 1 (Hi-Z state high), 0 (Hi-Z state low) *HiZVolt* – Hi-Z volt level: 0 (70 Volt), 1 (100 Volt), 0xff (Ignore). Optional, active only in high state			
Notes			
Active only when state is high. Ignore everything else.			
K-Config Example			
Set the line level output to Hi-Z and 70V: "#AUD-HI-Z 2,1,0",0x0D			

AUD-IN-CONF

Functions		Permission	Transparency
Set:	**AUD-IN-CONF**	End User	Public
Get	**AUD-IN-CONF?**	End User	Public
Description		**Syntax**	
Set:	Set threshold and time to indicate when signal is presents or not.	**#AUD-IN-CONF**SP*Channel*,*ThresholdDbLevel*,*TrigTimeDelay*CR	
Get:	Get threshold and time	**#AUD-IN-CONF?**CR*Channel*	
Response			
~nn**@AUD-IN-CONF**SP*Channel*,*ThresholdDbLevel*,*TrigTimeDelay*CR LF			
Parameters			
Channel – 1 (Speaker Output), **2** (Line Level Output) *ThresholdDbLevel* – input level indicating when a signal is not present, range **-100** to **0**dB *TrigTimeDelay* – 10 (fixed)			
K-Config Example			
Set the speaker output threshold level and time: "#AUD-IN-CONF 1,-50,10",0x0D			

AUD-LVL

Functions		Permission	Transparency
Set:	**AUD-LVL**	End User	Public
Get:	**AUD-LVL?**	End User	Public
Description		**Syntax**	
Set:	Set volume level	**#AUD-LVL**SP*stage*,*channel*,*volume*,*mutebehavior*CR	
Get:	Get volume level	**#AUD-LVL?**SP*stage*,*channel*CR	

Response

~nn**@AUD-LVL**SP*stage*,*channel*,*volume*CR LF

Parameters

stage – 1 (For output processing)
channel – 1 (Speaker Output), 2 (Line Level Output), -- (Decrease volume), ++ (Increase volume) or by a set dB value
volume –-80db to 10dB (Set volume level),
mutebehavior – optional, 1 (changing the volume does not affect the mute state)

K-Config Example

Set the speaker output audio level t0 -50dB:
"#AUD-LVL 1,1,-50",0x0D
Increase the line-level output audio by 2dB:
"#AUD-LVL 1,2,++2",0x0D
Decrease the line-level output audio:
"#AUD-LVL 1,2,--",0x0D

AUD-MIX

Functions		Permission	Transparency
Set:	**AUD-MIX**	End User	Public
Get:	**AUD-MIX?**	End User	Public
Description		**Syntax**	
Set:	Set mixer level	**#AUD-MIX**SP*channel*,*knob*,*level*CR	
Get:	Get mixer level	**#AUD-MIX?**SP*channel*,*knob*CR	

Response

~nn**@AUD-MIX**SP*channel*,*knob*,*level*CR LF

Parameters

channel – 1 (Speaker Output), 2 (Line Level Output)
knob – mixer knob number: 1 (Input 1), 2 (Input 2)
level – mixer level: -80 to 10dB

K-Config Example

Set the input mixing level of input 2 on the speaker output to -48dB:
"#AUD-MIX 1,2,-48",0x0D

AUD-MONO-MODE

Functions		Permission	Transparency
Set:	**AUD-MONO-MODE**	End User	Public
Get	**AUD-MONO-MODE?**	End User	Public
Description		**Syntax**	
Set:	Set output select state when audio in HI-Z mode only	**#AUD-MONO-MODE**SP*MonoMode*CR	
Get:	Get output select state when audio in HI-Z mode only	**#AUD-MONO-MODE?**CR	

Response

~nn**@AUD-MONO-MODE**SP*MonoMode*CR LF

Parameters

MonoMode – The mono output mode:

0 (output is ”stereo mix to mono” – both left and right mix to one channel),
1 (output is “left to mono” – duplicate left channel information to the right and play both)

Notes

These commands are active only when the state is HI-Z, otherwise an error is returned.
To set, the *MonoMode* parameter must be used.

K-Config Example

Set the output to mix to mono:
“#AUD-MONO-MODE 0”,0x0D

AUD-SIGNAL

Functions		Permission	Transparency
Set:	–	–	–
Get	**AUD-SIGNAL?**	End User	Public
Description		**Syntax**	
Set:	–	–	
Get:	Get audio input signal status	**#AUD-SIGNAL?**SP*inp_id*CR	

Response

~nn**@AUD-SIGNAL**SP*inp_id*,*status*CR LF

Parameters

Inp_id – input number: 1 (Input 1), 2 (Input 2)
status – 0 (OFF, no signal), 1 (ON, signal present)

Response Triggers

After execution, response is sent to the com port from which the Get was received
Response is sent to all com ports if audio status state was changed on any input

K-Config Example

get the status of input 1:
“#AUD-SIGNAL? 1”,0x0D

AUD-STANDBY

Functions		Permission	Transparency
Set:	**AUD-STANDBY**	End User	Public
Get	**AUD-STANDBY?**	End User	Public
Description		**Syntax**	
Set:	Set standby mode	**#AUD-STANDBY** SP *StandbyMode*,*TimeDelay* CR	
Get:	Get standby mode state	**#AUD-STANDBY?** CR	
Response			
~nn**@AUD-STANDBY** SP *StandbyMode*,*TimeDelay* CR LF			
Parameters			
StandbyMode – 0 (Off), 1 (Delayed, auto mode), 2 (Standby mode) *TimeDelay* – 5, 10, or 15 (time delay [min] to standby mode)			
Notes			
Active only in auto mode			
K-Config Example			
Set the standby delay time to 10 minutes: "#AUD-STANDBY 1,10",0x0D			

BALANCE

Functions		Permission	Transparency
Set:	**BALANCE**	End User	Public
Get:	**BALANCE?**	End User	Public
Description		**Syntax**	
Set:	Set balance level	**#BALANCE** SP *channel*,*balancelevel* CR	
Get:	Get balance level	**#BALANCE?** SP *channel* CR	
Response			
~nn**@BALANCE** SP *channel*,*balance_level* CR LF			
Parameters			
channel – 1 (Speaker output), 2 (Line level output) *balancelevel* – −15 to +15 (audio parameter in Kramer units, minus sign precedes negative values) ++ increase current value -- decrease current value			
K-Config Example			
Set the speaker output balance to +12: "#BALANCE 1,12",0x0D			

EQ-FREQ

Functions		Permission	Transparency
Set:	**EQ-FREQ**	End User	Public
Get	**EQ-FREQ?**	End User	Public
Description		**Syntax**	
Set:	Set equalizer frequency	**#EQ- FREQ**SP*Stage*,*Channel*,*EqType*,*EqFreq*CR	
Get:	Get equalizer frequency	**#EQ- FREQ?**SP*Stage*,*Channel*,*EqType*CR	

Response

~nn**@EQ- FREQ**SP*Stage*,*Channel*,*EqType*,*EqFreq*CR LF

Parameters

Stage – 1 (Output)
Channel – 1 (Speaker output), 2 (Line Level Output)
EqType – 0 (Bass), 1 (Middle), 2 (Treble)
EqFreq –

0 (T: 10kHz, M: 500Hz, B: 60Hz),
1 (T: 12.5kHz, M: 1kHz, B: 80Hz),
2 (T: 15kHz, M: 1.5kHz, B: 500Hz),
3 (T: 17.5kHz, M: 2.5kHz, B: 200Hz)

Notes

T=Treble, M=Middle, B=Bass

K-Config Example

Set speaker output equalizer frequency on the bass to 200Hz:
"#EQ-FREQ 1,1,0,3",0x0D

EQ-LVL

Functions		Permission	Transparency
Set:	**EQ-LVL**	End User	Public
Get:	**EQ-LVL?**	End User	Public
Description		**Syntax**	
Set:	Set equalization level	**#EQ-LVL**SP*Stage*,*Channel*,*EqType*,*Level*CR	
Get :	Get equalization level	**#EQ-LVL?**SP*Stage*,*Channel*,*EqType*CR	

Response

~nn**@EQ-LVL**SP*Stage*,*Channel*,*EqType*,*Level*CR LF

Parameters

Stage – 1 (Output processing)
Channel – 1 (Speaker output), 2 (Line level output)
EqType – 0 (Bass), 1 (Middle), 2 (Treble)
Level –equalizer level

K-Config Example

Set Bass EQ level of the speaker output to 12:
"#EQ-LVL 1,1,0,12",0x0D

EQ-Q

Functions		Permission	Transparency
Set:	**EQ-Q**	End User	Public
Get	**EQ-Q?**	End User	Public
Description		**Syntax**	
Set:	Set Q level	**#EQ-Q**SP*Channel*,*EqType*,*Q_level*CR	
Get:	Get Q level	**#EQ-Q?**SP*Channel*,*EqType*CR	
Response			
~nn**@EQ-Q**SP*Channel*,*EqType*,*Q_level*CR LF			
Parameters			
Channel – 1 (Speaker output), 2 (Line level output) *EqType* – 0 (Bass), 1 (Middle), 2 (Treble) *Q_level* – 0 to 15 (Q level)			
K-Config Example			
Set the line level output treble Q level to 8: "#EQ-Q 1,2,8 4",0x0D			

MUTE

Functions		Permission	Transparency
Set:	**MUTE**	End User	Public
Get:	**MUTE?**	End User	Public
Description		**Syntax**	
Set:	Set audio mute	**#MUTE**SP*channel*,*mute_mode*CR	
Get:	Get audio mute	**#MUTE?**SP*channel*CR	
Response			
~nn**@MUTE**SP*channel*,*mute_mode*CR LF			
Parameters			
channel – 1 (Speaker output), 2 (Line level output) *mute_mode* – 0 (Off), 1 (On)			
K-Config Example			
Set speaker output to mute: "#MUTE 1,1",0x0D			

Communication Commands

These commands are used by network devices running Protocol 3000.

Command	Description
NET-CONFIG	Set/get a network configuration
ETH-PORT	Set/get Ethernet port protocol
NET-DHCP	Set/get DHCP mode
NET-MAC?	Get MAC address

NET-CONFIG

Functions		Permission	Transparency
Set:	**NET-CONFIG**	End User	Public
Get:	**NET-CONFIG?**	End User	Public
Description		**Syntax**	
Set:	Set a network configuration.	**#NET-CONFIG** SP *id*,*ip*,*net_mask*,*gateway* CR LF	
Get:	Get a network configuration.	**#NET-CONFIG?** SP *id* CR LF	

Response

Get: ~nn**@NET-CONFIG** SP *id*,*ip*,*net_mask*,*gateway* CR LF

Parameters

id – network ID
ip – network IP
net_mask – network mask
gateway – network gateway

K-Config Example

```
"#NET-CONFIG 1,192.168.113.10,255.255.0.0,192.168.0.1",0x0D
```

ETH-PORT

Functions		Permission	Transparency
Set:	**ETH-PORT**	Administrator	Public
Get:	**ETH-PORT?**	End User	Public
Description		**Syntax**	
Set:	Set Ethernet port protocol	**#ETH-PORT** SP *portType*,*ETHPort* CR	
Get:	Get Ethernet port protocol	**#ETH-PORT?** SP *portType* CR	

Response

~nn**@ETH-PORT** SP *portType*,*ETHPort* CR LF

Parameters

portType – 0 (TCP), 1 (UDP)
ETHPort – 0-65534 (TCP / UDP port number)

Notes

If the port number you enter is already in use, an error is returned.
The port number must be within the following range: 2000-(2^16-1).
UDP port 50001 and TCP port 5001 are reserved for internal use.

K-Config Example

Set the Ethernet port protocol for TCP to port 12457:

```
"#ETH-PORT 0,12457",0x0D
```

NET-DHCP

Functions		Permission	Transparency
Set:	**NET-DHCP**	Administrator	Public
Get:	**NET-DHCP?**	End User	Public
Description		**Syntax**	
Set:	Set DHCP mode	**#NET-DHCP**SP*mode*CR	
Get:	Get DHCP mode	**#NET-DHCP?**CR	

Response

~nn**@NET-DHCP**SP*mode*CR LF

Parameters

mode –

0 (do not use DHCP. Use the IP address set by the factory or the NET-IP command),
1 (try to use DHCP. If unavailable, use the IP address set by the factory or the NET-IP command)

Notes

Connecting Ethernet to devices with DHCP may take more time in some networks
To connect with a randomly assigned IP by DHCP, specify the device DNS name (if available) using the command “NAME”. You can also get an assigned IP by direct connection to USB or RS-232 protocol port if available
For proper settings consult your network administrator

K-Config Example

Enable DHCP mode, if available:
“#NET-DHCP 1”,0x0D

NET-MAC?

Functions		Permission	Transparency
Set:	–	–	–
Get:	**NET-MAC?**	End User	Public
Description		**Syntax**	
Set:	–	–	
Get:	Get MAC address	**#NET-MAC?**CR	

Response

~nn**@NET-MAC**SP*mac_address*CR LF

Parameters

mac_address – Unique MAC address. Format: XX-XX-XX-XX-XX-XX where X is hex digit

K-Config Example

“#NET-MAC?”,0x0D

The warranty obligations of Kramer Electronics Inc. ("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 this Coverage Lasts

The standard limited warranty for Kramer products is seven (7) years from the date of original purchase, with the following exceptions:

1. All Kramer VIA hardware products are covered by a standard three (3) year warranty for the VIA hardware and a standard three (3) year warranty for firmware and software updates.
2. All Kramer fiber optic cables, adapter-size fiber optic extenders, active cables, cable retractors, all Kramer speakers and Kramer touch panels are covered by a standard one (1) year warranty.
3. All Kramer Cobra products, all Kramer Calibre products, all Kramer Minicom digital signage products, all HighSecLabs products, all streaming, and all wireless products are covered by a standard three (3) year warranty.
4. All Sierra Video MultiViewers are covered by a standard five (5) year warranty.
5. Sierra switchers & control panels are covered by a standard seven (7) year warranty (excluding power supplies and fans that are covered for three (3) years).
6. K-Touch software is covered by a standard one (1) year warranty for software updates.
7. All Kramer passive cables are covered by a ten (10) year warranty.

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

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SAFETY WARNING

Disconnect the unit from the power supply before opening and servicing

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We welcome your questions, comments, and feedback.

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