KRAMER

USER MANUAL

MODEL:

PT-12
HDMI Controller

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/PT-12 to check for up-to-date user manuals, application programs, and to check if firmware upgrades are available (where appropriate).

Achieving 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 **PT-12** away from moisture, excessive sunlight and dust.

Safety Instructions

Caution:

- This equipment is to be used only inside a building. It may only be connected to other equipment that is installed inside a building.
- For products with relay terminals and GPI\O ports, please refer to the permitted rating for an external connection, located next to the terminal or in the User Manual.
- There are no operator serviceable parts inside the unit.

Warning:

- Use only the power cord that is supplied with the unit.
- To ensure continuous risk protection, replace fuses only according to the rating specified on the product label which located on the bottom of the unit.

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 **PT-12 HDMI Controller**. **PT-12** is a CEC-enabled TV/display ON/OFF controller and extended EDID processor for HDMI™ signals up to 4K@60Hz (4:2:0) resolution. When **PT-12** detects an HDMI cable plug, it automatically turns ON the connected display, and automatically shuts OFF the display when signal loss is detected. **PT-12** is also a processing tool for controlling the EDID functions.

Features

- Automates Meeting Rooms – Simplifies meeting beginning and ending by automatically turning ON a CEC-enabled display when the presentation source is plugged in and OFF when the source is unplugged. The shutdown delay time is user-defined.
- High-Performance HDMI Controller – Supports pass-through of signals up to 4K@60Hz (4:2:0) resolution with user control of signal capabilities and functions.
- Selectable HDCP Authorization – Allows the user to control the appearance of an HDCP or non-HDCP input to the source to permit delivery of protection-free content, such as personal clips and charts, without HDCP encryption. HDCP protected content is not passed in non-HDCP mode.
- Video Signal Control – Define color depth attributes and color space capabilities of pass-through video signal. Lock the EDID configuration to ensure proper video display.
- Audio Signal Control – User defines whether to allow the full signal to pass through or to limit the audio to 2 channel LPCM.
- Simple Operation – Includes DIP-switches for defining basic controller functions.
- Cost-Effective Maintenance – Status LED indicators for HDMI ports and power facilitate easy local maintenance and troubleshooting. Local device management and firmware upgrade via mini-USB port and DIP-switches, ensure lasting, field-proven deployment.
- Easy Installation – Compact, fan-less PicoTOOLS® enclosure for device-back mounting, or side-by-side mounting of 4 units in a 1U rack space with the recommended Kramer rack adapter.

Typical Applications

PT-12 is ideal for the following typical applications:

- Home theatre or meeting room, automatic TV ON/OFF controller.
- Adapting new device compatibilities with older AV infrastructure.
- Supporting AV troubleshooting.

Defining PT-12 HDMI Controller

This section defines **PT-12**.

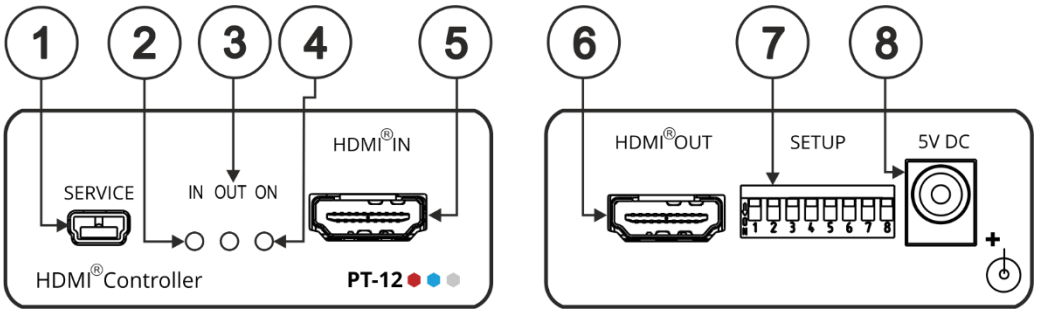


Figure 1: **PT-12 HDMI Controller**

#	Feature	Function
1	SERVICE Mini USB Connector	Connect to a PC/laptop to modify the EDID using EDID Designer software, control **PT-12** via P3K protocol or to update the firmware.
2	IN LED	Lights green when an active HDMI source is connected to the input.
3	OUT LED	Lights green when an HDMI acceptor is connected to the output. Flashes three times upon successful load of the designed EDID and then resumes normal operation.
4	ON LED	Lights green when power is connected.
5	HDMI® IN Connector	Connect to an HDMI source.
6	HDMI® OUT Connector	Connect to an HDMI acceptor.
7	SETUP DIP-Switches	Use to configure device settings (see Configuring Using DIP-Switches on page 7).
8	5V DC Power Connector	Connect to the included power adapter.

Mounting PT-12

This section provides instructions for mounting **PT-12**. Before installing, verify that the environment is within the recommended range:

- Operation 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.

Caution:

- Mount **PT-12** before connecting any cables or power.

Warning:

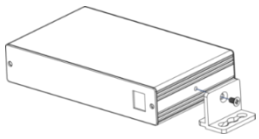
- Ensure that the environment (e.g., maximum ambient temperature & air flow) is compatible for the device.
- Avoid uneven mechanical loading.
- Appropriate consideration of equipment nameplate ratings should be used for avoiding overloading of the circuits.
- Reliable earthing of rack-mounted equipment should be maintained.
- Maximum mounting height for the device using supplied brackets is 2 meters.

To mount PT-12 in a rack:

Mount the unit in a rack using the recommended rack adapter (see www.kramerav.com/product/PT-12).

To mount PT-12 on a table or shelf:

- 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/PT-12.

Connecting PT-12

Always switch off the power to each device before connecting it to your **PT-12**. After connecting your **PT-12**, connect its power and then switch on the power to each device.

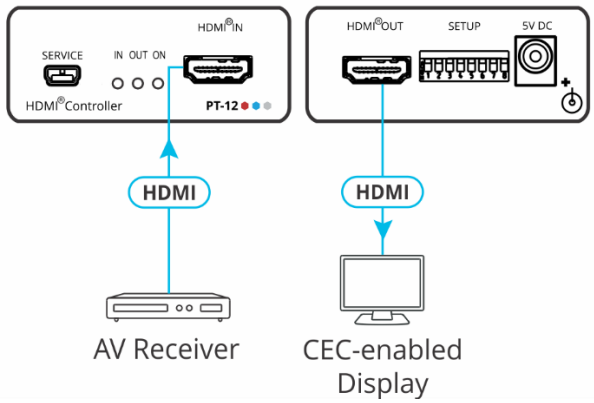


Figure 2: Connecting to the **PT-12**

To connect PT-12 as illustrated in the example in Figure 2:

1. Connect the HDMI source (for example, an AV receiver) to the HDMI IN Connector (5) on the front panel.
2. Connect the HDMI OUT Connector (6) to a CEC-enabled display.
3. Connect the power adapter to **PT-12** and to the mains electricity (not shown in Figure 2).

Configuring PT-12

You can configure **PT-12** in the following ways:

- DIP-Switches (see Configuring Using DIP-Switches on page 7).
- EDID Designer Software – to modify the EDID (see Modifying EDID with EDID Designer on page 9).
- Protocol 3000 API (see Protocol 3000 Commands on page 15).

Configuring Using DIP-Switches

PT-12 enables you to control EDID lock, define signal parameters, configure display auto power and display auto sleep, and upgrade the device firmware using the DIP-switches on the back panel.

The following table describes the **PT-12** DIP-switches.

By default, all switches are in the OFF (up) position.

All changes in the DIP-switch settings take effect on-the-fly, without the need for a power cycle.

<table>
<tr><th>#</th><th>Feature</th><th colspan="3">Description</th></tr>
<tr><td>1</td><td>EDID Lock</td><td colspan="3">OFF (up) – Lock the current EDID so that changes on the output do not result in changes to the EDID.
ON (down) – EDID is passed-through and acquired automatically.</td></tr>
<tr><td>2</td><td>Deep Color</td><td colspan="3">OFF (up) – Limit color depth to 8 bits per color.
ON (down) – Pass-through color depth parameters.</td></tr>
<tr><td>3</td><td>Audio Pass-through</td><td colspan="3">OFF (up) – Audio transmission is limited to 2-channel LPCM only.
ON (down) – Audio transmission is passed-through.
Audio pass-through setup takes effect only when DIP-switch 1 is OFF (EDID locked), otherwise, it is ignored.</td></tr>
<tr><td>4</td><td>HDCP Operation</td><td colspan="3">OFF (up) – HDCP is disabled, giving the appearance that HDCP is not supported.
ON (down) – HDCP is enabled, giving the appearance of an HDCP authorized device to allow unsecured content display by all market-available computer sources.</td></tr>
<tr><td>5</td><td>Display Auto Power</td><td colspan="3">OFF (up) – Display auto power is enabled.
ON (down) – Display auto power is disabled.</td></tr>
<tr><td rowspan="6">6, 7</td><td rowspan="6">Display Auto Sleep</td><td colspan="3">Enable/disable auto delay (before 5V output cut-off) of the connected display when no active input signal is detected.</td></tr>
<tr><td>DIP 6</td><td>DIP 7</td><td>Delay before Auto Sleep (before 5V output cut-off)</td></tr>
<tr><td>OFF</td><td>OFF</td><td>Auto Sleep is disabled</td></tr>
<tr><td>ON</td><td>OFF</td><td>5s</td></tr>
<tr><td>OFF</td><td>ON</td><td>1m</td></tr>
<tr><td>ON</td><td>ON</td><td>15m</td></tr>
<tr><td>8</td><td>CPU FW Upgrade</td><td colspan="3">OFF (up) – Normal operation mode.
ON (down) – CPU firmware upgrade mode.
When set to ON the device is inactive.</td></tr>
</table>

Configuring Automatic Power Controls

PT-12 enables you to configure the following automatic power controls for your connected display:

- Configuring Display Auto Sleep on page 8.
- Configuring Display Auto Power on page 8.

Configuring Display Auto Sleep

As long as there is an active source signal, the connected display remains ON. When the active source becomes incative, a 5V signal is sent to the display to delay it from going into sleep (standby) mode. **PT-12** enables you to enable/disable and set the delay time before the 5V output cuts off.

To configure the auto sleep delay:

- Set DIP-switch 6 and 7 to the required position (see Configuring Using DIP-Switches on page 7).

Configuring Display Auto Power

PT-12 features display auto power via CEC communication. This feature turns ON a display that is in sleep mode when an active signal is detected and turns it OFF (shuts down) when the active signal becomes inactive. **PT-12** enables you to enable/disable display auto power and to set the delay time before the display is turned OFF.

Enabling/Disabling Display Auto Power

To enable/disable the display auto power feature:

- Set DIP-switch 5 to the required position (see Configuring Using DIP-Switches on page 7).

Setting Delay Time for Display Auto Power Shutdown

When the display auto sleep delay (see Configuring Display Auto Sleep on page 8) is set to a shorter time than the display auto power delay, the 5V does not shut OFF until display auto power turns OFF the display.

To set the delay time before display auto power shutdown:

- Use the AV-SWITCHING-MODE command (see Protocol 3000 Commands on page 15).

Defining EDID Lock

PT-12 enables you to define whether to enable the EDID values to be passed through the device and changed automatically to follow the output or to lock the EDID so that it will not be affected by changes on the output.

To define EDID lock:

- Set DIP-switch 1 to the required position (see Configuring Using DIP-Switches on page 7).

Modifying EDID with EDID Designer

To download the software and user manual for EDID Designer, go to: www.kramerav.com/product/PT-12.

To modify the EDID with Kramer EDID Designer software:

1. Connect your computer to the **PT-12** SERVICE Mini USB Connector (1).
2. Use the Kramer **EDID Designer** software.

Defining Color Depth and Spacing

PT-12 enables you to define the color depth pass-through and to force RGB color spacing.

Defining Color Depth Pass-Through

PT-12 enables you to define whether to pass the full color depth parameters through the device or to limit color depth to 8 bits per color.

To define color depth pass-through:

- Set DIP-switch 2 to the required position (see Configuring Using DIP-Switches on page 7).

Forcing RGB Color Spacing

To force RGB color spacing:

- Use the CS-CONVERT Protocol 3000 API command (see Protocol 3000 Commands on page 15).

Defining Audio Pass-Through

PT-12 enables you to define whether the full audio transmission is passed through the device or the audio transmission is limited to 2-channel LPCM only.

To define audio pass-through:

- Set DIP-switch 3 to the required position (see Configuring Using DIP-Switches on page 7).

Setting HDCP Operation

PT-12 enables you to enable or disable HDCP. When HDCP is enabled, the **PT-12** input appears to be HDCP compliant to the connected source, and vice versa. This allows the source to transmit a non-HDCP signal, if required.

To set HDCP operation:

- Set DIP-switch 4 to the required position (see Configuring Using DIP-Switches on page 7).

Upgrading Firmware

Use Kramer **K-UPLOAD** software to upgrade the firmware via the **PT-12** SERVICE Mini USB Connector (1) when DIP-switch 8 set to ON (down position).

The latest version of **K-UPLOAD** and installation instructions can be downloaded from our website at: www.kramerav.com/support/product_downloads.asp.

Before using the micro USB port, install the Kramer USB driver, available at: www.kramerav.com/support/product_downloads.asp.

Technical Specifications

Inputs	1 HDMI	On a female HDMI connector
Outputs	1 HDMI	On a female HDMI connector
Ports	1 USB	On a female mini USB connector
Video	Max Resolution	4K@60Hz (4:2:0)
	Max Data Rate	10.2Gbps (3.4Gbps per data channel)
	Compliance	HDCP 1.4
User Interface	Controls	8 DIP-switches
	Indicator	HDMI In, HDMI Out, Power LEDs
Power	Source	5V DC
	Consumption	315mA
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	Vibration	ISTA 1A in carton (International Safe Transit Association)
	Safety	CE
	Environmental	RoHs, WEEE
Enclosure	Size	PicoTOOLS®
	Type	Aluminum
	Cooling	Convection ventilation
General	Net Dimensions (W, D, H)	6.22cm x 5.18cm x 2.44cm (2.45" x 2.04" x 0.96") W, D, H
	Shipping Dimensions (W, D, H)	15.70cm x 12.00cm x 8.70cm (6.18" x 4.72" x 3.43") W, D, H
	Net Weight	0.1kg (0.2lbs) approx.
	Shipping Weight	0.6kg (1.3lbs) approx.
Accessories	Included	Power adapter, bracket kit
Specifications are subject to change without notice at www.kramerav.com		

Default EDID

```
Monitor
  Model name..... PT-12
  Manufacturer..... KMR
  Plug and Play ID..... KMR1200
  Serial number..... n/a
  Manufacture date..... 2015, ISO week 255
  Filter driver..... None
  ------------------------
  EDID revision..... 1.3
  Input signal type..... Digital
  Color bit depth..... Undefined
  Display type..... RGB color
  Screen size..... 520 x 320 mm (24.0 in)
  Power management..... Standby, Suspend, Active off/sleep
  Extension blocs..... 1 (CEA-EXT)
  ------------------------
  DDC/CI..... Supported
  MCCS revison..... 2.1
  Display technology..... TFT
  Controller..... STMicro 0x9301
  Firmware revision..... 2.1
  Firmware flags..... 0x006645CC
  Active power on time..... Not supported
  Power consumption..... Not supported
  Current frequency..... 74.20kHz, 60.20Hz
Color characteristics
  Default color space..... Non-sRGB
  Display gamma..... 2.20
  Red chromaticity..... Rx 0.674 - Ry 0.319
  Green chromaticity..... Gx 0.188 - Gy 0.706
  Blue chromaticity..... Bx 0.148 - By 0.064
  White point (default).... Wx 0.313 - Wy 0.329
  Additional descriptors... None
Timing characteristics
  Horizontal scan range.... 30-83kHz
  Vertical scan range..... 56-76Hz
  Video bandwidth..... 170MHz
  CVT standard..... Not supported
  GTF standard..... Not supported
  Additional descriptors... None
  Preferred timing..... Yes
  Native/preferred timing.. 1280x720p at 60Hz (16:10)
    Modeline..... "1280x720" 74.250 1280 1390 1430 1650 720 725 730 750 +hsync +vsync
Standard timings supported
     720 x  400p at  70Hz - IBM VGA
     720 x  400p at  88Hz - IBM XGA2
     640 x  480p at  60Hz - IBM VGA
     640 x  480p at  67Hz - Apple Mac II
     640 x  480p at  72Hz - VESA
     640 x  480p at  75Hz - VESA
     800 x  600p at  56Hz - VESA
     800 x  600p at  60Hz - VESA
     800 x  600p at  72Hz - VESA
     800 x  600p at  75Hz - VESA
     832 x  624p at  75Hz - Apple Mac II
    1024 x  768i at  87Hz - IBM
    1024 x  768p at  60Hz - VESA
    1024 x  768p at  70Hz - VESA
    1024 x  768p at  75Hz - VESA
    1280 x 1024p at  75Hz - VESA
    1152 x  870p at  75Hz - Apple Mac II
    1280 x 1024p at  75Hz - VESA STD
    1280 x 1024p at  85Hz - VESA STD
    1600 x 1200p at  60Hz - VESA STD
    1024 x  768p at  85Hz - VESA STD
     800 x  600p at  85Hz - VESA STD
     640 x  480p at  85Hz - VESA STD
    1152 x  864p at  70Hz - VESA STD
    1280 x  960p at  60Hz - VESA STD
EIA/CEA-861 Information
  Revision number..... 3
  IT underscan..... Supported
  Basic audio..... Supported
  YCbCr 4:4:4..... Supported
  YCbCr 4:2:2..... Supported
  Native formats..... 1
  Detailed timing #1..... 1920x1080p at 60Hz (16:10)
    Modeline..... "1920x1080" 148.500 1920 2008 2052 2200 1080 1084 1089 1125 +hsync +vsync
  Detailed timing #2..... 1920x1080i at 60Hz (16:10)
    Modeline..... "1920x1080" 74.250 1920 2008 2052 2200 1080 1084 1094 1124 interlace +hsync +vsync
  Detailed timing #3..... 1280x720p at 60Hz (16:10)
    Modeline..... "1280x720" 74.250 1280 1390 1430 1650 720 725 730 750 +hsync +vsync
  Detailed timing #4..... 720x480p at 60Hz (16:10)
    Modeline..... "720x480" 27.000 720 736 798 858 480 489 495 525 -hsync -vsync
CE audio data (formats supported)
  LPCM    2-channel, 16/20/24 bit depths at 32/44/48 kHz
CE video identifiers (VICs) - timing/formats supported
    1920 x 1080p at  60Hz - HDTV (16:9, 1:1)
    1920 x 1080i at  60Hz - HDTV (16:9, 1:1)
    1280 x  720p at  60Hz - HDTV (16:9, 1:1) [Native]
     720 x  480p at  60Hz - EDTV (16:9, 32:27)
     720 x  480p at  60Hz - EDTV (4:3, 8:9)
     720 x  480i at  60Hz - Doublescan (16:9, 32:27)
     720 x  576i at  50Hz - Doublescan (16:9, 64:45)
     640 x  480p at  60Hz - Default (4:3, 1:1)
    NB: NTSC refresh rate = (Hz*1000)/1001
CE vendor specific data (VSDB)
  IEEE registration number. 0x000C03
  CEC physical address..... 1.0.0.0
```

Maximum TMDS clock..... 165MHz
CE speaker allocation data
Channel configuration.... 2.0
Front left/right..... Yes
Front LFE..... No
Front center..... No
Rear left/right..... No
Rear center..... No
Front left/right center.. No
Rear left/right center... No
Rear LFE..... No
Report information
Date generated..... 2/16/2016
Software revision..... 2.60.0.972
Data source..... Real-time 0x0041
Operating system..... 6.1.7601.2.Service Pack 1
Raw data
00,FF,FF,FF,FF,FF,FF,00,2D,B2,00,12,00,00,00,00,FF,19,01,03,80,34,20,78,EA,B3,25,AC,51,30,B4,26,
10,50,54,FF,FF,80,81,8F,81,99,A9,40,61,59,45,59,31,59,71,4A,81,40,01,1D,00,72,51,D0,1E,20,6E,28,
55,00,07,44,21,00,00,1E,00,00,00,FD,00,38,4C,1E,53,11,00,0A,20,20,20,20,20,20,00,00,00,FC,00,50,
54,2D,32,43,20,20,20,20,20,20,20,20,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,01,CD,
02,03,1B,F1,23,09,07,07,48,10,05,84,03,02,07,16,01,65,03,0C,00,10,00,83,01,00,00,02,3A,80,18,71,
38,2D,40,58,2C,45,00,07,44,21,00,00,1E,01,1D,80,18,71,1C,16,20,58,2C,25,00,07,44,21,00,00,9E,01,
1D,00,72,51,D0,1E,20,6E,28,55,00,07,44,21,00,00,1E,8C,0A,D0,8A,20,E0,2D,10,10,3E,96,00,07,44,21,
00,00,18,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,47

Protocol 3000

Kramer devices can be operated using Kramer Protocol 3000 commands sent via serial or Ethernet ports.

Understanding Protocol 3000

Protocol 3000 commands are a sequence of ASCII letters, structured according to the following.

- **Command format**:

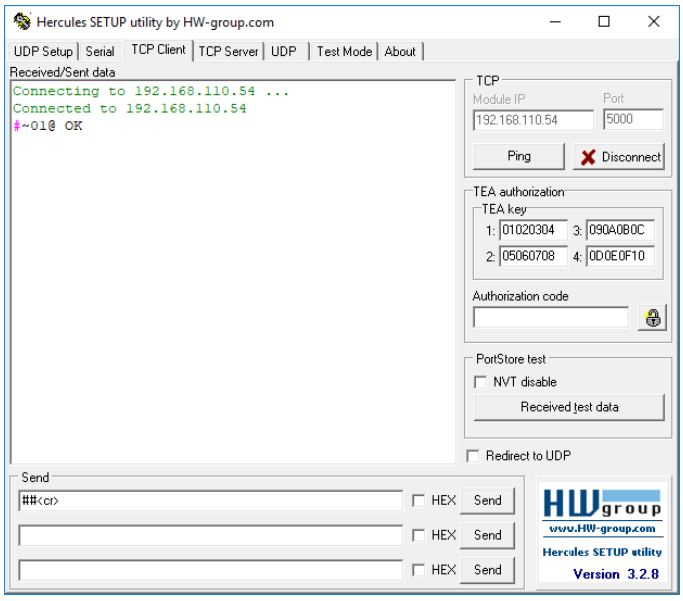
Prefix	Command Name	Constant (Space)	Parameter(s)	Suffix
#	Command	␣	Parameter	<CR>

- **Feedback format**:

Prefix	Device ID	Constant	Command Name	Parameter(s)	Suffix
~	nn	@	Command	Parameter	<CR><LF>

- **Command parameters** – Multiple parameters must be separated by a comma (,). In addition, multiple parameters can be grouped as a single parameter using brackets ([and]).
- **Command chain separator character** – Multiple commands can be chained in the same string. Each command is delimited by a pipe character (|).
- **Parameters attributes** – Parameters may contain multiple attributes. Attributes are indicated with pointy brackets (<…>) and must be separated by a period (.).

The command framing varies according to how you interface with **PT-12**. The following figure displays how the # command is framed using terminal communication software (such as Hercules):



Protocol 3000 Commands

Function	Description	Syntax	Parameters/Attributes	Example
#	Protocol handshaking. Validates the Protocol 3000 connection and gets the machine number. Step-in master products use this command to identify the availability of a device.	COMMAND #<CR> FEEDBACK ~nn@ ok<CR><LF>		#<CR>
AV-SW-TIMEOUT	Set display auto power shutdown (via CEC communication) delay after active signal stops.	COMMAND #AV-SW-TIMEOUT switching_mode,time_out<CR> FEEDBACK ~nn@AV-SW-TIMEOUT switching_mode,time_out<CR><LF>	switching_mode – Switching mode 8 – display auto power shutdown time_out – Delay in seconds 0 - 60000	Set the display auto shutdown for 60 seconds after the active signal stops: #AV-SW-TIMEOUT 8,60<CR>
AV-SW-TIMEOUT?	Get display auto power shutdown (via CEC communication) delay after active signal stops.	COMMAND #AV-SW-TIMEOUT? switching_mode<CR> FEEDBACK ~nn@AV-SW-TIMEOUT switching_mode,time_out<CR><LF>	switching_mode – Switching mode 8 – display auto power shutdown time_out – Delay in seconds 0 - 60000	Get the display auto shutdown delay time: #AV-SW-TIMEOUT? 8<CR>
BUILD-DATE?	Get device build date.	COMMAND #BUILD-DATE? <CR> FEEDBACK ~nn@BUILD-DATE date,time<CR><LF>	date – Format: YYYY/MM/DD where YYYY = Year MM = Month DD = Day time – Format: hh:mm:ss where hh = hours mm = minutes ss = seconds	Get the device build date: #BUILD-DATE?<CR>
CEC-MODE?	Get the CEC mode status.	COMMAND #CEC-MODE? <CR> FEEDBACK ~nn@CEC-MODE cec_mode<CR><LF>	cec_mode – CEC mode 0 – CEC mode switched off and automatic TV power function disabled 1 – CEC mode switched on and automatic TV power function enabled	Get the CEC mode status: #CEC-MODE?<CR>
CPEDID	Copy EDID data from the output to the input EEPROM. Destination bitmap size depends on device properties (for 64 inputs it is a 64-bit word). Example: bitmap 0x0013 means inputs 1,2 and 5 are loaded with the new EDID. In certain products Safe_mode is an optional parameter. See the HELP command for its availability.	COMMAND #CPEDID edid_io,src_id,edid_io,dest_bitmap<CR> or #CPEDID edid_io,src_id,edid_io,dest_bitmap,safe_mode<CR> FEEDBACK ~nn@CPEDID edid_io,src_id,edid_io,dest_bitmap<CR><LF> ~nn@CPEDID edid_io,src_id,edid_io,dest_bitmap,safe_mode<CR><LF>	edid_io – *EDID* source type (usually output) 0 – Input 1 – Output 2 – Default EDID 3 – Custom EDID src_id – Number of chosen source stage 0 – Default EDID source 1 – Output 1 edid_io – *EDID destination* type (usually input) 0 – Input 1 – Output 2 – Default EDID 3 – Custom EDID dest_bitmap – Bitmap representing destination IDs. Format: XXXX…X, where X is hex digit. The binary form of every hex digit represents corresponding destinations. 0 – indicates that EDID data is not copied to this destination. 1 – indicates that EDID data is copied to this destination. safe_mode – Safe mode 0 – device accepts the EDID as is without trying to adjust 1 – device tries to adjust the EDID (default value if no parameter is sent)	Copy the EDID data from the Output 1 (EDID source) to the Input: #CPEDID 1,1,0,0x1<CR> Copy the EDID data from the default EDID source to the Input: #CPEDID 2,0,0,0x1<CR>
CS-CONVERT	Set the “force RGB color space” convert mode.	COMMAND #CS-CONVERT out_index,cs_mode<CR> FEEDBACK ~nn@CS-CONVERT out_index,cs_mode<CR><LF>	out_index – Number that indicates the specific output: 1 cs_mode – Index in resolution table 0 – Color space pass (default) 1 – Enable “force RGB color space” convert mode	Enable “force RGB color space” convert mode for output 1: #CS-CONVERT 1,1<CR>
CS-CONVERT?	Get the “force RGB color space” convert mode status.	COMMAND #CS-CONVERT? out_index<CR> FEEDBACK ~nn@CS-CONVERT out_index,cs_mode<CR><LF>	out_index – Number that indicates the specific output: 1 cs_mode – Index in resolution table 0 – Color space pass (default) 1 – Enable “force RGB color space” convert mode	Get the “force RGB color space” convert mode status for channel 1: #CS-CONVERT 1<CR>
DISPLAY?	Get output HPD status.	COMMAND #DISPLAY? out_index<CR> FEEDBACK ~nn@DISPLAY out_index,status<CR><LF>	out_index – Number that indicates the specific output: 1 status – HPD status according to signal validation 0 – Signal or sink is not valid 1 – Signal or sink is valid 2 – Sink and EDID is valid	Get the output HPD status of Output 1: #DISPLAY? 1<CR>

Function	Description	Syntax	Parameters/Attributes	Example
DPSW-STATUS?	Get the DIP-switch state.	**COMMAND** **#DPSW-STATUS?** dip_id**<CR>** **FEEDBACK** **~nn@DPSW-STATUS** dip_id,status**<CR><LF>**	**dip_id** – 1 to 8 (number of DIP switches) **status** – Up/down 0 – Up 1 – Down	Get the DIP-switch 2 status: **#DPSW-STATUS? 2<CR>**
FACTORY	Reset device to factory default configuration. ⓘ 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.	**COMMAND** **#FACTORY<CR>** **FEEDBACK** **~nn@FACTORY** ok**<CR><LF>**		Reset the device to factory default configuration: **#FACTORY<CR>**
GEDID	Get EDID support on certain input/output.	**COMMAND** **#GEDID** io_mode,in_index**<CR>** **FEEDBACK** **~nn@GEDID** io_mode,in_index,size**<CR><LF>**	**io_mode** – Input/Output 0 – Input 1 – Output **in_index** – Number that indicates the specific input: 1 **size** – Size of data to be sent from device, 0 means no EDID support	Get EDID support information for input 1: **#GEDID** 1,1**<CR>**
HDCP-MOD?	Get HDCP mode. ⓘ Set HDCP working mode on the device input: HDCP supported - HDCP_ON [default]. HDCP not supported - HDCP OFF. HDCP support changes following detected sink - MIRROR OUTPUT.	**COMMAND** **#HDCP-MOD?** in_index**<CR>** **FEEDBACK** **~nn@HDCP-MOD** in_index,mode**<CR><LF>**	**in_index** – Number that indicates the specific input: 1-N (N= the total number of inputs) **mode** – HDCP mode: 0 – HDCP Off 3 – HDCP defined according to the connected output	Get the input HDCP-MODE of IN 1 HDMI: **#HDCP-MOD?** 1**<CR>**
HDCP-STAT?	Get HDCP signal status. ⓘ io_mode =1 – get the HDCP signal status of the sink device connected to the specified output. io_mode =0 – get the HDCP signal status of the source device connected to the specified input.	**COMMAND** **#HDCP-STAT?** io_mode,in_index**<CR>** **FEEDBACK** **~nn@HDCP-STAT** io_mode,in_index,status**<CR><LF>**	**io_mode** – Input/Output 0 – Input 1 – Output **in_index** – Number that indicates the specific input: 1-N (N= the total number of inputs) **status** – Signal encryption status - valid values On/Off 0 – HDCP Off 1 – HDCP On	Get the output HDCP-STATUS of IN 1: **#HDCP-STAT?** 0,1**<CR>**
HELP	Get command list or help for specific command.	**COMMAND** **#HELP<CR>** **#HELP** cmd_name**<CR>** **FEEDBACK** 1. Multi-line: **~nn@Device** cmd_name, cmd_name…**<CR><LF>** To get help for command use: HELP (COMMAND_NAME)<CR><LF> **~nn@HELP** cmd_name:**<CR><LF>** **description<CR><LF>** **USAGE:usage<CR><LF>**	**cmd_name** – Name of a specific command	Get the command list: **#HELP<CR>** To get help for AV-SW-TIMEOUT: HELP **av-sw-timeout**<CR>

Function	Description	Syntax	Parameters/Attributes	Example
LDEDID	Write EDID data from external application to device. ⓘ When the unit receives the LDEDID command it replies with READY and enters the special EDID packet wait mode. In this mode the unit can receive only packets and not regular protocol commands. If the unit does not receive correct packets for 30 seconds or is interrupted for more than 30 seconds before receiving all packets, it sends timeout error **~nn@LDEDID** **err01**<CR><LF> and returns to the regular protocol mode. If the unit received data that is not a correct packet, it sends the corresponding error and returns to the regular protocol mode.	COMMAND Multi-step syntax FEEDBACK Step 1: **#LDEDID** edid_io,dest_bitmask,edid_size,safe_mode**<CR>** Response 1: **~nn@LDEDID** edid_io,dest_bitmask,edid_size,safe_mode ready **<CR><LF>** or **~nn@LDEDID** errnn**<CR><LF>** Step 2: If ready was received, send EDID_DATA Response 2: **~nn@LDEDID** edid_io,dest_bitmask,edid_size,safe_mode ok**<CR><LF>** or **~nn@LDEDID** errnn**<CR><LF>**	**edid_io** – EDID destination type (usually input) 0 – Input 1 – Output 2 – Default EDID 3 – Custom EDID **dest_bitmask** – Bitmap representing destination IDs. Format: 0x********, where * is ASCII presentation of hex digit. The binary presentation of this number is a bit mask for destinations. Setting '1' means EDID data has to be copied to this destination **edid_size** – EDID data size **safe_mode** – Safe mode 0 – Device accepts the EDID as is without trying to adjust 1 – Device tries to adjust the EDID **edid_data** – Data in protocol packets **Using the Packet Protocol** Send a command: LDRV, LOAD, IROUT, LDEDID Receive Ready or ERR### If Ready: **a**. Send a packet, **b**. Receive OK on the last packet, **c**. Receive OK for the command Packet structure: **Packet ID** (1, 2, 3…) (2 bytes in length) **Length** (data length + 2 for CRC) – (2 bytes in length) **Data** (data length -2 bytes) **CRC** – 2 bytes 01 | 02 | 03 | 04 | 05 | Packet ID | Length | Data | CRC 5. Response: ~nnnn ok<CR><LF> (Where ***NNNN*** is the received packet ID in ASCII hex digits.)	Write the EDID data from an external application to the HDMI In 1 input without adjustment attempts: **#LDEDID 0,0x1,2340,0<CR>** Write the EDID data from an external application to HDMI In 1 and PC In inputs with adjustment attempts: **#LDEDID 0,0x5,2340,1<CR>**
MODEL?	Get device model. ⓘ This command identifies equipment connected to **PT-12** and notifies of identity changes to the connected equipment. The Matrix saves this data in memory to answer REMOTE-INFO requests.	COMMAND **#MODEL?** **<CR>** FEEDBACK **~nn@MODEL** model_name**<CR><LF>**	**model_name** – String of up to 19 printable ASCII chars	Get the device model: **#MODEL?** **<CR>**
NAME	Set machine (DNS) name. ⓘ 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).	COMMAND **#NAME** machine_name**<CR>** FEEDBACK **~nn@NAME** machine_name**<CR><LF>**	**machine_name** – String of up to 15 alpha-numeric chars (can include hyphen, not at the beginning or end)	Set the DNS name of the device to room-442: **#NAME** room-442**<CR>**
NAME?	Get machine (DNS) name. ⓘ 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).	COMMAND **#NAME?** **<CR>** FEEDBACK **~nn@NAME** machine_name**<CR><LF>**	**machine_name** – String of up to 15 alpha-numeric chars (can include hyphen, not at the beginning or end)	Get the DNS name of the device: **#NAME?** **<CR>**
NAME-RST	Reset machine (DNS) name to factory default. ⓘ Factory default of machine (DNS) name is "KRAMER_" + 4 last digits of device serial number.	COMMAND **#NAME-RST<CR>** FEEDBACK **~nn@NAME-RST** ok**<CR><LF>**		Reset the machine name (S/N last digits are 0102): **#NAME-RST** kramer_0102**<CR>**
PROT-VER?	Get device protocol version.	COMMAND **#PROT-VER?** **<CR>** FEEDBACK **~nn@PROT-VER** 3000:version**<CR><LF>**	**version** – XX.XX where X is a decimal digit	Get the device protocol version: **#PROT-VER?** **<CR>**
RESET	Reset device. ⓘ 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.	COMMAND **#RESET<CR>** FEEDBACK **~nn@RESET** ok**<CR><LF>**		Reset the device: **#RESET<CR>**

Function	Description	Syntax	Parameters/Attributes	Example
SIGNAL?	Get input signal status.	**COMMAND** **#SIGNAL?** in_index **<CR>** **FEEDBACK** **~nn@SIGNAL** in_index,status **<CR><LF>**	**in_index** – Number that indicates the specific input: 1-N (N= the total number of inputs) **status** – Signal status according to signal validation: 0 – Off 1 – On	Get the input signal lock status of IN 1: **#SIGNAL?** 1 **<CR>**
SN?	Get device serial number.	**COMMAND** **#SN?** **<CR>** **FEEDBACK** **~nn@SN** serial_num **<CR><LF>**	**serial_num** – 14 decimal digits, factory assigned	Get the device serial number: **#SN?** **<CR>**
VERSION?	Get firmware version number.	**COMMAND** **#VERSION?** **<CR>** **FEEDBACK** **~nn@VERSION** firmware_version **<CR><LF>**	**firmware_version** – XX.XX.XXXX where the digit groups are: major.minor.build version	Get the device firmware version number: **#VERSION?** **<CR>**

Result and Error Codes

Syntax

In case of an error, the device responds with an error message. The error message syntax:

- **~NN@ERR XXX<CR><LF>** – when general error, no specific command
- **~NN@CMD ERR XXX<CR><LF>** – for specific command
- **NN** – machine number of device, default = 01
- **XXX** – error code

Error Codes

Error Name	Error Code	Description
P3K_NO_ERROR	0	No error
ERR_PROTOCOL_SYNTAX	1	Protocol syntax
ERR_COMMAND_NOT_AVAILABLE	2	Command not available
ERR_PARAMETER_OUT_OF_RANGE	3	Parameter out of range
ERR_UNAUTHORIZED_ACCESS	4	Unauthorized access
ERR_INTERNAL_FW_ERROR	5	Internal FW error
ERR_BUSY	6	Protocol busy
ERR_WRONG_CRC	7	Wrong CRC
ERR_TIMEDOUT	8	Timeout
ERR_RESERVED	9	(Reserved)
ERR_FW_NOT_ENOUGH_SPACE	10	Not enough space for data (firmware, FPGA…)
ERR_FS_NOT_ENOUGH_SPACE	11	Not enough space – file system
ERR_FS_FILE_NOT_EXISTS	12	File does not exist
ERR_FS_FILE_CANT_CREATED	13	File can’t be created
ERR_FS_FILE_CANT_OPEN	14	File can’t open
ERR_FEATURE_NOT_SUPPORTED	15	Feature is not supported
ERR_RESERVED_2	16	(Reserved)
ERR_RESERVED_3	17	(Reserved)
ERR_RESERVED_4	18	(Reserved)
ERR_RESERVED_5	19	(Reserved)
ERR_RESERVED_6	20	(Reserved)
ERR_PACKET_CRC	21	Packet CRC error
ERR_PACKET_MISSED	22	Packet number isn't expected (missing packet)
ERR_PACKET_SIZE	23	Packet size is wrong
ERR_RESERVED_7	24	(Reserved)
ERR_RESERVED_8	25	(Reserved)
ERR_RESERVED_9	26	(Reserved)
ERR_RESERVED_10	27	(Reserved)
ERR_RESERVED_11	28	(Reserved)
ERR_RESERVED_12	29	(Reserved)
ERR_EDID_CORRUPTED	30	EDID corrupted
ERR_NON_LISTED	31	Device specific errors
ERR_SAME_CRC	32	File has the same CRC – no changed
ERR_WRONG_MODE	33	Wrong operation mode
ERR_NOT_CONFIGURED	34	Device/chip was not initialized

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What is Not Covered

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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).
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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. If a direct or similar replacement product is supplied, the original product's end warranty date remains unchanged and is transferred to the replacement 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.

How to Obtain a Remedy Under This Limited Warranty

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, visit our web site at www.kramerav.com or contact the Kramer Electronics office nearest you.

In order to pursue any remedy under this limited warranty, you must possess an original, dated receipt as proof of purchase from an authorized Kramer Electronics reseller. If this product is returned under this limited warranty, a return authorization number, obtained from Kramer Electronics, will be required (RMA number). You may also be directed to an authorized reseller or a person authorized by Kramer Electronics to repair the product.

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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KRAMER

P/N: 2900-301020 Rev: 1

SAFETY WARNING

Disconnect the unit from the power supply before opening and servicing

For the latest information on our products and a list of Kramer distributors, visit our Web site where updates to this user manual may be found.

We welcome your questions, comments, and feedback.

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