

Protocol Commands

MODEL:

VP-427UHD

HDMI/HDBT Receiver/Switcher/Scaler

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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:**

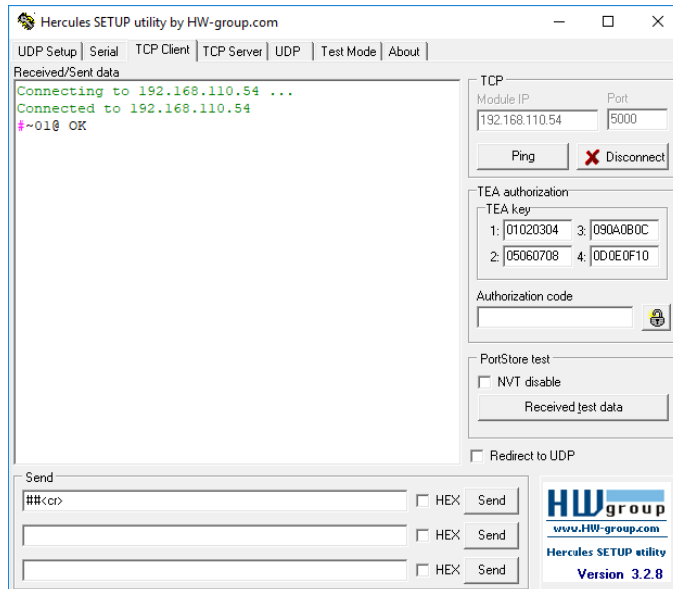
Prefix	Command Name	Constant (Space)	Parameter(s)	Suffix
#	Command	_	Parameter	<CR>

- **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 the **VP-427UHD**. 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>
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>
ETH-PORT	Set Ethernet port protocol. ⓘ If the port number you enter is already in use, an error is returned. The port number must be within the following range: 0-(2*16-1).	COMMAND #ETH-PORT_port_type,port_id<CR> FEEDBACK ~nn@ETH-PORT_port_type,port_id<CR><LF>	port_type – TCP/UDP port_id – TCP/UDP port number (0 – 65535)	Set the Ethernet port protocol for TCP to port 12457: #ETH-PORT_0,12457<CR>
ETH-PORT?	Get Ethernet port protocol.	COMMAND #ETH-PORT?_port_type<CR> FEEDBACK ~nn@ETH-PORT_port_type,port_id<CR><LF>	port_type – TCP/UDP 0 – TCP 1 – UDP port_id – TCP / UDP port number (0 – 65535)	Get the Ethernet port protocol for UDP: #ETH-PORT?_1<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>
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
MODEL?	<p>Get device model.</p> <p>i This command identifies equipment connected to VP-427UHD and notifies of identity changes to the connected equipment. The Matrix saves this data in memory to answer REMOTE-INFO requests.</p>	<p>COMMAND</p> <pre>#MODEL?_<CR></pre> <p>FEEDBACK</p> <pre>~nn@MODEL_<model_name><CR><LF></pre>	<p>model_name – String of up to 19 printable ASCII chars</p>	<p>Get the device model:</p> <pre>#MODEL?_<CR></pre>
NAME	<p>Set machine (DNS) name.</p> <p>i 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).</p>	<p>COMMAND</p> <pre>#NAME_<machine_name><CR></pre> <p>FEEDBACK</p> <pre>~nn@NAME_<machine_name><CR><LF></pre>	<p>machine_name – String of up to 15 alpha-numeric chars (can include hyphen, not at the beginning or end)</p>	<p>Set the DNS name of the device to room-442:</p> <pre>#NAME_<room-442><CR></pre>
NAME?	<p>Get machine (DNS) name.</p> <p>i 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).</p>	<p>COMMAND</p> <pre>#NAME?_<CR></pre> <p>FEEDBACK</p> <pre>~nn@NAME_<machine_name><CR><LF></pre>	<p>machine_name – String of up to 15 alpha-numeric chars (can include hyphen, not at the beginning or end)</p>	<p>Get the DNS name of the device:</p> <pre>#NAME?_<CR></pre>
NAME-RST	<p>Reset machine (DNS) name to factory default.</p> <p>i Factory default of machine (DNS) name is "KRAMER_" + 4 last digits of device serial number.</p>	<p>COMMAND</p> <pre>#NAME-RST<CR></pre> <p>FEEDBACK</p> <pre>~nn@NAME-RST_<ok><CR><LF></pre>		<p>Reset the machine name (S/N last digits are 0102):</p> <pre>#NAME-RST_<kramer_0102><CR></pre>
NET-DHCP	<p>Set DHCP mode.</p> <p>i Only 1 is relevant for the mode value. To disable DHCP, the user must configure a static IP address for the device.</p> <p>Connecting Ethernet to devices with DHCP may take more time in some networks.</p> <p>To connect with a randomly assigned IP by DHCP, specify the device DNS name (if available) using the NAME command. You can also get an assigned IP by direct connection to USB or RS-232 protocol port, if available.</p> <p>For proper settings consult your network administrator.</p> <p>i For Backward compatibility, the id parameter can be omitted. In this case, the Network ID, by default, is 0, which is the Ethernet control port.</p>	<p>COMMAND</p> <pre>#NET-DHCP_<netw_id>,<dhcp_state><CR></pre> <p>FEEDBACK</p> <pre>~nn@NET-DHCP_<netw_id>,<dhcp_state><CR><LF></pre>	<p>netw_id – Network ID—the device network interface (if there are more than one). Counting is 0 based, meaning the control port is '0', additional ports are 1,2,3....</p> <p>dhcp_state –</p> <p>1 – Try to use DHCP. (If unavailable, use the IP address set by the factory or the net-ip command).</p>	<p>Enable DHCP mode for port 1, if available:</p> <pre>#NET-DHCP_<1>,<1><CR></pre>
NET-DHCP?	<p>Get DHCP mode.</p> <p>i For Backward compatibility, the id parameter can be omitted. In this case, the Network ID, by default, is 0, which is the Ethernet control port.</p>	<p>COMMAND</p> <pre>#NET-DHCP?_<netw_id><CR></pre> <p>FEEDBACK</p> <pre>~nn@NET-DHCP_<netw_id>,<dhcp_mode><CR><LF></pre>	<p>netw_id – Network ID—the device network interface (if there are more than one). Counting is 0 based, meaning the control port is '0', additional ports are 1,2,3....</p> <p>dhcp_mode –</p> <p>0 – Do not use DHCP. Use the IP set by the factory or using the net-ip or net-config command.</p> <p>1 – Try to use DHCP. If unavailable, use the IP set by the factory or using the net-ip or net-config command.</p>	<p>Get DHCP mode for port 1:</p> <pre>#NET-DHCP?_<1><CR></pre>

Function	Description	Syntax	Parameters/Attributes	Example
NET-GATE	Set gateway IP. ⓘ A network gateway connects the device via another network and maybe over the Internet. Be careful of security issues. For proper settings consult your network administrator.	COMMAND #NET-GATE_ip_address<CR> FEEDBACK ~nn@NET-GATE_ip_address<CR><LF>	ip_address – Format: xxx.xxx.xxx.xxx	Set the gateway IP address to 192.168.0.1: #NET-GATE_192.168.0.001<CR>
NET-GATE?	Get gateway IP. ⓘ A network gateway connects the device via another network and maybe over the Internet. Be aware of security problems.	COMMAND #NET-GATE?_<CR> FEEDBACK ~nn@NET-GATE_ip_address<CR><LF>	ip_address – Format: xxx.xxx.xxx.xxx	Get the gateway IP address: #NET-GATE?_<CR>
NET-IP	Set IP address. ⓘ For proper settings consult your network administrator.	COMMAND #NET-IP_ip_address<CR> FEEDBACK ~nn@NET-IP_ip_address<CR><LF>	ip_address – Format: xxx.xxx.xxx.xxx	Set the IP address to 192.168.1.39: #NET-IP_192.168.001.039<CR>
NET-IP?	Get IP address.	COMMAND #NET-IP?_<CR> FEEDBACK ~nn@NET-IP_ip_address<CR><LF>	ip_address – Format: xxx.xxx.xxx.xxx	Get the IP address: #NET-IP?_<CR>
NET-MAC?	Get MAC address. ⓘ For backward compatibility, the id parameter can be omitted. In this case, the Network ID, by default, is 0, which is the Ethernet control port.	COMMAND #NET-MAC?_id<CR> FEEDBACK ~nn@NET-MAC_id,mac_address<CR><LF>	id – Network ID—the device network interface (if there are more than one). Counting is 0 based, meaning the control port is '0', additional ports are 1,2,3.... mac_address – Unique MAC address. Format: XX-XX-XX-XX-XX-XX where X is hex digit	#NET-MAC?_id<CR>
NET-MASK	Set subnet mask. ⓘ For proper settings consult your network administrator.	COMMAND #NET-MASK_net_mask<CR> FEEDBACK ~nn@NET-MASK_net_mask<CR><LF>	net_mask – Format: xxx.xxx.xxx.xxx	Set the subnet mask to 255.255.0.0: #NET-MASK_255.255.000.000<CR>
NET-MASK?	Get subnet mask.	COMMAND #NET-MASK?_<CR> FEEDBACK ~nn@NET-MASK_net_mask<CR><LF>	net_mask – Format: xxx.xxx.xxx.xxx	Get the subnet mask: #NET-MASK?_<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>
PRST-RCL	Recall saved preset list. ⓘ In most units, video and audio presets with the same number are stored and recalled together by commands #PRST-STO and #PRST-RCL.	COMMAND #PRST-RCL_preset<CR> FEEDBACK ~nn@PRST-RCL_preset<CR><LF>	preset – Preset number	Recall preset 1: #PRST-RCL_1<CR>
PRST-STO	Store current connections, volumes and modes in preset. ⓘ In most units, video and audio presets with the same number are stored and recalled together by commands #PRST-STO and #PRST-RCL.	COMMAND #PRST-STO_preset<CR> FEEDBACK ~nn@PRST-STO_preset<CR><LF>	preset – Preset number	Store preset 1: #PRST-STO_1<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>
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>

Function	Description	Syntax	Parameters/Attributes	Example
UPGRADE	<p>Perform firmware upgrade.</p> <p> Not necessary for some devices.</p> <p>Firmware usually uploads to a device via a command like LDFW.</p> <p>Reset the device to complete the process.</p>	<p>COMMAND</p> <p>#UPGRADE<CR></p> <p>FEEDBACK</p> <p>~nn@UPGRADE_ok<CR><LF></p>		<p>Perform firmware upgrade:</p> <p>#UPGRADE<CR></p>
VERSION?	<p>Get firmware version number.</p>	<p>COMMAND</p> <p>#VERSION?_<CR></p> <p>FEEDBACK</p> <p>~nn@VERSION_firmware_version<CR><LF></p>	<p>firmware_version – XX.XX.XXXX where the digit groups are: major.minor.build version</p>	<p>Get the device firmware version number:</p> <p>#VERSION?_<CR></p>

Protocol Y

Y commands are structured according to the following:

- **Command format:**

Prefix	Constant (Space)	Control Type	Command Name	Parameter(s)
#Y	␣	0=Set command 1=Get command	Function Number	Parameter

- **Feedback format:**

Prefix	Constant (Space)	Control Type	Command Name	Parameter(s)
~01@Y	␣	0=Set command 1=Get command	Function Number	Parameter

- **Example:**

Set Command:

Type in: "Y Control_Type=0,Function,Param"
 Reply: "~id=01Y Control_Type=0,Function,Param OK"
 Set command example, set window control (721) to PiP:
 Send: "#y 0,721,1"
 Reply: "~01@Y 0,721,1 OK"

Get Command:

Type in: "Y Control_Type=1,Function"
 Result: "~id=01Y Control_Type=1,Function,Param"
 Get command example: get window control setup (721):
 Send: "#y 1,721"
 Result: "~01@y 1,721,1"

Protocol Y Commands

The following table lists the VP-427UHD "Y commands".

Description	Function #	Parameter Value
Input Switch Mode	114	0 = Input Switch Mode forced by Input Source parameter (see next item – function 115) or by Input HDBT/HDMI button (default) 1 = Auto Input Switch Mode when signal loss 2 = Auto Input Switch Mode to last connected input
Input Source	115	0 = HDMI input is active or has higher priority 1 = HDBT input is active or has higher priority
HDMI Input HDCP capability	116	0 = YES – there is HDCP capability 1 = NO – input is HDCP non-capable
HDBT Input HDCP capability	117	0 = YES – there is HDCP capability 1 = NO – input is HDCP non-capable
Input SIGNAL LOSS handle mode	118	0 = Blue screen – default 1 = Black screen 2 = Freeze Last Picture 3 = Turn off HDMI output 20 sec after signal loss

Description	Function #	Parameter Value
Output Video Resolution	200	0 = Native (default) 1 = 480i/60 2 = 576i/50 3 = 720p/50 4 = 720p/59 5 = 720p/60 6 = 1080i/50 7 = 1080i/59 8 = 1080i/60 9 = 1080p/23 1 = 1080p/24 11 = 1080p/25 12 = 1080p/29 13 = 1080p/30 14 = 1080p/50 15 = 1080p/59 16 = 1080p/60 17 = 1080sf/23 18 = 1080sf/24 19 = 1080sf/25 20 = 1080sf/29 21 = 1080sf/30 22 = 640x480/60 23 = 640x480/72 24 = 640x480/75 25 = 640x480/85 26 = 800x600/60 27 = 800x600/72 28 = 800x600/75 29 = 800x600/85 30 = 1024x768/60 31 = 1024x768/70 32 = 1024x768/75 33 = 1024x768/85 34 = 1152x864/75 35 = 1280x768/60 reduced blanking 36 = 1280x768/60 37 = 1280x768/75 38 = 1280x800/60 39 = 1280x960/60 40 = 1280x960/85 41 = 1280x1024/60 42 = 1280x1024/75 43 = 1360x768/60 44 = 1366x768/60 45 = 1400x1050/60 reduced blanking 46 = 1400x1050/60 47 = 1400x1050/75 48 = 1440x900/60 reduced blanking 49 = 1440x900/60 50 = 1440x900/75 51 = 1440x900/85 52 = 1600x1200/60 53 = 1680x1050/60 reduced blanking 54 = 1680x1050/60 55 = 1920x1200/60 reduced blanking 56 = 480p/60 57 = 576p/50 58 = 3840x2160p/24 59 = 3840x2160p/25 60 = 3840x2160p/30 61 = 3840x2160p/50 62 = 3840x2160p/60
TEST SIGNAL	201	0 = NO TEST SIGNAL - default 1 = COLOR BARS100% 2 = SPLIT BARS 100% 3 = TILT LINE 4 = CROSS HATCH 5 = MODULATED RAMPS 6 = MOVING TILT LINE

Description	Function #	Parameter Value
Output FORMAT select method	202	0 = AUTO 1 = Forced HDMI always 2 = Forced DVI always
UHD transition to HD filter	203	0 = NO FILTER – Default 1 = SOFT FILTER ENABLED
FREEZE	204	0 = Unfreeze image 1 = Freeze image
Output HDCP mode	205	0 = FOLLOW OUTPUT – default 1 = FOLLOW INPU3 2 = ALWAYS ON 3 = ALWAYS OFF
PORT RS232 DESTINATION	206	0 = Unit control 1 = Pass through
EXTRA RANGE	207	0 = Normal 1 = Extra Range (only for resolutions not higher than 1080p/60)
SELECT EDID	208	0 = UHD 4K 1 = 1080P

Description	Function #	Parameter Value
Input Resolution	301	1 = 480i/60 2 = 576i/50 3 = 720p/50 4 = 720p/59 5 = 720p/60 6 = 1080i/50 7 = 1080i/59 8 = 1080i/60 9 = 1080p/23 10 = 1080p/24 11 = 1080p/25 12 = 1080p/29 13 = 1080p/30 14 = 1080p/50 15 = 1080p/59 16 = 1080p/60 17 = 1080sf/23 18 = 1080sf/24 19 = 1080sf/25 20 = 1080sf/29 21 = 1080sf/30 22 = 640x480/60 23 = 640x480/72 24 = 640x480/75 25 = 640x480/85 26 = 800x600/60 27 = 800x600/72 28 = 800x600/75 29 = 800x600/85 30 = 1024x768/60 31 = 1024x768/70 32 = 1024x768/75 33 = 1024x768/85 34 = 1152x864/75 35 = 1280x768/60 reduced blanking 36 = 1280x768/60 37 = 1280x768/75 38 = 1280x800/60 39 = 1280x960/60 40 = 1280x960/85 41 = 1280x1024/60 42 = 1280x1024/75 43 = 1360x768/60 44 = 1366x768/60 45 = 1400x1050/60 reduced blanking 46 = 1400x1050/60 47 = 1400x1050/75 48 = 1440x900/60 reduced blanking 49 = 1440x900/60 50 = 1440x900/75 51 = 1440x900/85 52 = 1600x1200/60 53 = 1680x1050/60 reduced blanking 54 = 1680x1050/60 55 = 1920x1200/60 reduced blanking 56 = 480p/60 57 = 576p/50 58 = 3840x2160p/24 59 = 3840x2160p/25 60 = 3840x2160p/30 61 = 3840x2160p/50 62 = 3840x2160p/60 99 = UNIDENTIFIED INPUT SIGNAL 100 = NO INPUT SIGNAL
Image brightness	319	[-50:50] If parameter = 0 then default brightness (100%)
Image contrast	320	[-50:50] If parameter = 0 then default contrast (100%)
Image color	321	[-100:50] If parameter = 0 then default color (100%).
Image sharpness	322	[0:11] If parameter = 0 - no sharpness, if = 11, then max sharpness 110% Step = 10%

Description	Function #	Parameter Value
Horizontal image size (for aspect 16:9)	323	[-50:50] If parameter = 0 then image is fitted to the screen
Vertical image size (for aspect 16:9)	324	[-50:50] If parameter = 0 then image is fitted to the screen
Horizontal image size (for aspect 4:3)	325	[-50:50] If parameter = 0 then image is fitted to the screen
Vertical image size (for aspect 4:3)	326	[-50:50] If parameter = 0 then image is fitted to the screen
Horizontal image position	327	[-100:100] If parameter = 0 then image is fitted to the screen without horizontal shift. Step 0.1%
Vertical image position	328	[-100:100] If parameter = 0 then image is fitted to the screen without vertical shift. Step 0.1%
Delay of Blue or Black Screen	329	0 = 2 sec 1 = 5 sec 2 = 10 sec 3 = 20 sec
Freeze delay time	330	[1:6] If parameter = 1 (default) delay = 1 sec. Step 1 sec
Freeze delay mode	331	No additional delay Delay only in case of repeated signal loss Delay after every single signal loss

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