

# Protocol 3000

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

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## Understanding Protocol 3000

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

- **Command format:**

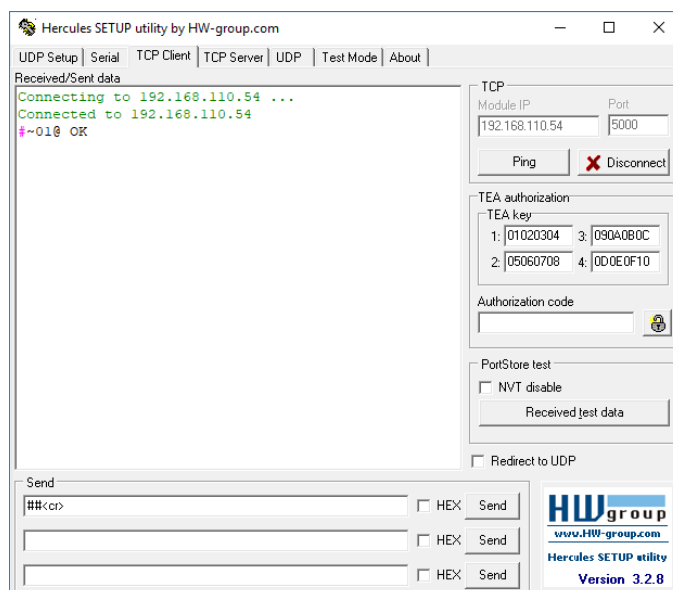
Prefix	Command Name	Constant (Space)	Parameter(s)	Suffix
#	Command	_	Parameter	<CR>

- **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 **KIT-400T**. 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.  ① Validates the Protocol 3000 connection and gets the machine number.  Step-in master products use this command to identify the availability of a device.	<b>COMMAND</b> #<CR> <b>FEEDBACK</b> ~nn@_ok<CR><LF>		#<CR>
AUD-EMB?	Get audio in video embedding status.	<b>COMMAND</b> #AUD-EMB?_in_index,out_index<CR> <b>FEEDBACK</b> ~nn@AUD-EMB_in_index,out_index,emb_mode<CR><LF>	<b>in_index</b> – Number that indicates the specific input: 1 – IN 1 2 – IN 2 <b>out_index</b> – Number that indicates the specific output: 1 – HDBT OUT <b>emb_mode</b> – Embedding status 0 – Analog 1 – Embedded	Get IN 1 audio embedding status: #AUD-EMB?_1,1<CR>
AUD-LVL	Set volume level.	<b>COMMAND</b> #AUD-LVL_io_mode,io_index,vol_level<CR> <b>FEEDBACK</b> ~nn@AUD-LVL_io_mode,io_index,vol_level<CR><LF>	<b>io_mode</b> – Input/Output 1 – Output <b>io_index</b> – Number that indicates the specific input or output port: 1 – AUDIO OUT <b>vol_level</b> – Volume level -83db to 24dB; ++ (increase current value by 1dB); -- (decrease current value by 1dB)	Set AUDIO OUT level to -50dB: #AUD-LVL_1,1,-50<CR>
AUD-LVL?	Get volume level.	<b>COMMAND</b> #AUD-LVL?_io_mode,io_index<CR> <b>FEEDBACK</b> ~nn@AUD-LVL_io_mode,io_index,vol_level<CR><LF>	<b>io_mode</b> – Input/Output 1 – Output <b>io_index</b> – Number that indicates the specific input or output port: 1 – AUDIO OUT <b>vol_level</b> – Volume level -83db to 24dB; ++ (increase current value by 1dB); -- (decrease current value by 1dB)	Get AUDIO OUT level #AUD-LVL?_1,1<CR>
AUD-LVL-RANGE?	Get audio level min and max range.  ① In most devices min and max audio level is a function of HW implementation and the SET command is usually not implemented.	<b>COMMAND</b> #AUD-LVL-RANGE?_io_mode,io_index<CR> <b>FEEDBACK</b> ~nn@AUD-LVL-RANGE_io_mode,io_index,min_vol,max_vol<CR><LF>	<b>io_mode</b> – Input/Output 0 – Input 1 – Output <b>io_index</b> – Number that indicates the specific input or output port: 1-N (N= the total number of input or output ports) <b>min_vol</b> – -83dB <b>max_vol</b> – 24dB audio level	Get audio level min and max range for output 1 channel 2: #AUD-LVL-RANGE?_1,2<CR>
AUD-SIGNAL?	Get audio input signal status.	<b>COMMAND</b> #AUD-SIGNAL?_in_index<CR> <b>FEEDBACK</b> ~nn@AUD-SIGNAL_in_index,status<CR><LF>	<b>in_index</b> – Number that indicates the specific input: 1 – IN 1 2 – IN 2 3 – IN 3 <b>status</b> – On/Off 0 – Off (no signal) 1 – On (signal present)	Get the status of input 1: #AUD-SIGNAL?_1<CR>
AV-SW-MODE?	Get input auto switch mode (per output).	<b>COMMAND</b> #AV-SW-MODE?_layer_type,out_index<CR> <b>FEEDBACK</b> ~nn@AV-SW-MODE_layer_type,out_index,connection_mode<CR><LF>	<b>layer_type</b> – Number that indicates the signal type: 1 – Video 2 – Audio <b>out_index</b> – Number that indicates the specific output: for video layer: 1 – HDBT OUT for audio layer 1 – Audio Out <b>connection_mode</b> – Connection mode 0 – manual 1 – priority switch 2 – last connected switch	Get the input audio switch mode for HDBT Out: #AV-SW-MODE?_1,1<CR>
AV-SW-TIMEOUT	Set auto switching timeout.	<b>COMMAND</b> #AV-SW-TIMEOUT_switching_mode,time_out<CR> <b>FEEDBACK</b> ~nn@AV-SW-TIMEOUT_switching_mode,time_out<CR><LF>	<b>switching_mode</b> – Switching mode 0 – Video signal lost 2 – Audio signal lost 4 – Disable 5V on video output if no input signal detected 5 – Video cable unplugged 6 – Audio cable unplugged <b>time_out</b> – Timeout in seconds 0 - 60000	Set the auto switching timeout to 5 seconds in the event of 5V disable when no input signal is detected: #AV-SW-TIMEOUT_4,5<CR>
AV-SW-TIMEOUT?	Get auto switching timeout.	<b>COMMAND</b> #AV-SW-TIMEOUT?_switching_mode<CR> <b>FEEDBACK</b> ~nn@AV-SW-TIMEOUT_switching_mode,time_out<CR><LF>	<b>switching_mode</b> – Switching mode 0 – Video signal lost 2 – Audio signal lost 4 – Disable 5V on video output if no input signal detected 5 – Video cable unplugged 6 – Audio cable unplugged <b>time_out</b> – Timeout in seconds 0 - 60000	Get the Disable 5V on video output if no input signal detected timeout: #AV-SW-TIMEOUT?_4<CR>

Function	Description	Syntax	Parameters/Attributes	Example
BEACON-INFO?	Get beacon information, including IP address, UDP control port, TCP control port, MAC address, model, name.   There is no Set command. Get command initiates a notification.	<b>COMMAND</b> #BEACON-INFO?_port_id<CR>  <b>FEEDBACK</b> ~nn@BEACON-INFO_port_id,ip_string,udp_port,tcp_port,mac_address,model,name<CR><LF>	port_id – ID of the Ethernet port ip_string – Dot-separated representation of the IP address udp_port – UDP control port tcp_port – TCP control port mac_address – Dash-separated mac address model – Device model name – Device name	Get beacon information: #BEACON-INFO?_<CR>
BUILD-DATE?	Get device build date.	<b>COMMAND</b> #BUILD-DATE?_<CR>  <b>FEEDBACK</b> ~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>
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.	<b>COMMAND</b> #CPEDID_edid_io,src_id,edid_io,dest_bitmap<CR> or #CPEDID_edid_io,src_id,edid_io,dest_bitmap,safe_mode<CR>  <b>FEEDBACK</b> ~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 src_id – Number of chosen source stage for input source: 1 – IN 1 2 – IN 2 3 – IN 3 for output source: 1 – HDBT OUT for default source: 0 – Default EDID source edid_io – EDID destination type (usually input) 0 – Input 1 – Output 2 – Default 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 HDBT OUT (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>
DISPLAY?	Get output HPD status.	<b>COMMAND</b> #DISPLAY?_out_index<CR>  <b>FEEDBACK</b> ~nn@DISPLAY_out_index,status<CR><LF>	out_index – Number that indicates the specific output: 1 – HDBT OUT 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 HDBT OUT HPD status of Output 1: #DISPLAY?_1<CR>
DPSW-STATUS?	Get the DIP-switch state.	<b>COMMAND</b> #DPSW-STATUS?_dip_id<CR>  <b>FEEDBACK</b> ~nn@DPSW-STATUS_dip_id,status<CR><LF>	dip_id – 1 to 4 (number of DIP switches) 1 – Video switch 1 2 – Video switch 2 3 – Audio switch 3 4 – Audio switch 4 status – Up/down 0 – Up 1 – Down	get the DIP-switch 2 status: #DPSW-STATUS?_2<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).	<b>COMMAND</b> #ETH-PORT_port_type,port_id<CR>  <b>FEEDBACK</b> ~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.	<b>COMMAND</b> #ETH-PORT?_port_type<CR>  <b>FEEDBACK</b> ~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>

Function	Description	Syntax	Parameters/Attributes	Example
FACTORY	<p>Reset device to factory default configuration.</p> <p><b>i</b> This command deletes all user data from the device. The deletion can take some time.</p> <p>Your device may require powering off and powering on for the changes to take effect.</p>	<p><b>COMMAND</b></p> <pre>#FACTORY&lt;CR&gt;</pre> <p><b>FEEDBACK</b></p> <pre>~nn@FACTORY_ok&lt;CR&gt;&lt;LF&gt;</pre>		<p>Reset the device to factory default configuration:</p> <pre>#FACTORY&lt;CR&gt;</pre>
FPGA-VER?	Get current FPGA version.	<p><b>COMMAND</b></p> <pre>#FPGA-VER?_fpga_id&lt;CR&gt;</pre> <p><b>FEEDBACK</b></p> <pre>~nn@FPGA-VER_fpga_id,expected_ver,ver&lt;CR&gt;&lt;LF&gt;</pre>	<p><b>fpga_id</b> – FPGA id</p> <p><b>expected_ver</b> – Expected FPGA version for current firmware</p> <p><b>ver</b> – Actual FPGA version</p>	<p>Get current FPGA version:</p> <pre>#FPGA-VER?_1&lt;CR&gt;</pre>
HDCP-MOD	<p>Set HDCP mode.</p> <p><b>i</b> Set HDCP working mode on the device input:</p> <p>HDCP supported - HDCP_ON [default].</p> <p>HDCP not supported - HDCP OFF.</p> <p>HDCP support changes following detected sink - MIRROR OUTPUT.</p> <p>When you define 3 as the mode, the HDCP status is defined according to the connected output in the following priority: OUT 1, OUT 2. If the connected display on OUT 2 supports HDCP, but OUT 1 does not, then HDCP is defined as not supported. If OUT 1 is not connected, then HDCP is defined by OUT 2.</p>	<p><b>COMMAND</b></p> <pre>#HDCP-MOD_in_index,mode&lt;CR&gt;</pre> <p><b>FEEDBACK</b></p> <pre>~nn@HDCP-MOD_in_index,mode&lt;CR&gt;&lt;LF&gt;</pre>	<p><b>in_index</b> – Number that indicates the specific input:</p> <p>1 – IN 1</p> <p>2 – IN 2</p> <p>3 – IN 3</p> <p><b>mode</b> – HDCP mode:</p> <p>0 – HDCP Off</p> <p>3 – HDCP defined according to the connected output (MAC mode)</p>	<p>Set the input HDCP-MODE of IN 1 to Off:</p> <pre>#HDCP-MOD_1,0&lt;CR&gt;</pre>
HDCP-MOD?	<p>Get HDCP mode.</p> <p><b>i</b> Set HDCP working mode on the device input:</p> <p>HDCP supported - HDCP_ON [default].</p> <p>HDCP not supported - HDCP OFF.</p> <p>HDCP support changes following detected sink - MIRROR OUTPUT.</p>	<p><b>COMMAND</b></p> <pre>#HDCP-MOD?_in_index&lt;CR&gt;</pre> <p><b>FEEDBACK</b></p> <pre>~nn@HDCP-MOD_in_index,mode&lt;CR&gt;&lt;LF&gt;</pre>	<p><b>in_index</b> – Number that indicates the specific input:</p> <p>1 – IN 1</p> <p>2 – IN 2</p> <p>3 – IN 3</p> <p><b>mode</b> – HDCP mode:</p> <p>0 – HDCP Off</p> <p>3 – HDCP defined according to the connected output (MAC mode)</p>	<p>Get the input HDCP-MODE of IN 1 HDMI:</p> <pre>#HDCP-MOD?_1&lt;CR&gt;</pre>
HDCP-STAT?	<p>Get HDCP signal status.</p> <p><b>i</b> io_mode =1 – get the HDCP signal status of the sink device connected to the specified output.</p> <p>io_mode =0 – get the HDCP signal status of the source device connected to the specified input.</p>	<p><b>COMMAND</b></p> <pre>#HDCP-STAT?_io_mode,in_index&lt;CR&gt;</pre> <p><b>FEEDBACK</b></p> <pre>~nn@HDCP-STAT_io_mode,in_index,status&lt;CR&gt;&lt;LF&gt;</pre>	<p><b>io_mode</b> – Input/Output</p> <p>0 – Input</p> <p>1 – Output</p> <p><b>io_index</b> – Number that indicates the specific number of inputs or outputs (based on io_mode):</p> <p>for Input:</p> <p>1 – IN 1</p> <p>2 – IN 2</p> <p>3 – IN 3</p> <p>for output:</p> <p>1 – HDBT OUT</p> <p><b>status</b> – Signal encryption status - valid values On/Off</p> <p>0 – HDCP Off</p> <p>1 – HDCP On</p>	<p>Get the output HDCP-STATUS of IN 1:</p> <pre>#HDCP-STAT?_0,1&lt;CR&gt;</pre>
HELP	Get command list or help for specific command.	<p><b>COMMAND</b></p> <pre>#HELP&lt;CR&gt;</pre> <p><b>#HELP_cmd_name&lt;CR&gt;</b></p> <p><b>FEEDBACK</b></p> <p>1. Multi-line:</p> <pre>~nn@Device_cmd_name,_cmd_name.&lt;CR&gt;&lt;LF&gt;</pre> <p>To get help for command use: HELP (COMMAND_NAME)&lt;CR&gt;&lt;LF&gt;</p> <pre>~nn@HELP_cmd_name:&lt;CR&gt;&lt;LF&gt;</pre> <p><b>description&lt;CR&gt;&lt;LF&gt;</b></p> <p><b>USAGE: usage&lt;CR&gt;&lt;LF&gt;</b></p>	<p><b>cmd_name</b> – Name of a specific command</p>	<p>Get the command list:</p> <pre>#HELP&lt;CR&gt;</pre> <p>To get help for AV-SW-TIMEOUT:</p> <pre>HELP_av-sw-timeout&lt;CR&gt;</pre>
LOCK-EDID	Lock last read EDID.	<p><b>COMMAND</b></p> <pre>#LOCK-EDID_in_index,lock_mode&lt;CR&gt;</pre> <p><b>FEEDBACK</b></p> <pre>~nn@LOCK-EDID_in_index,lock_mode&lt;CR&gt;&lt;LF&gt;</pre>	<p><b>in_index</b> – Number that indicates the specific input:</p> <p>1 – IN 1</p> <p>2 – IN 2</p> <p>3 – IN 3</p> <p><b>lock_mode</b> – On/Off</p> <p>0 – Off unlocks EDID</p> <p>1 – On locks EDID</p>	<p>Lock the last read EDID from the HDMI In 2 input:</p> <pre>#LOCK-EDID_2,1&lt;CR&gt;</pre>








Function	Description	Syntax	Parameters/Attributes	Example
LOCK-EDID?	Get EDID lock state.	<b>COMMAND</b> #LOCK-EDID?_in_index,<CR> <b>FEEDBACK</b> ~nn@LOCK-EDID_in_index,lock_mode<CR><LF>	in_index – Number that indicates the specific input: 1 – IN 1 2 – IN 2 3 – IN 3 lock_mode – On/Off 0 – Off unlocks EDID 1 – On locks EDID	Get EDID lock state for Input 2: #LOCK-EDID?_2<CR>
LOGIN	Set protocol permission. <i>ⓘ</i> The permission system works only if security is enabled with the "SECUR" command. LOGIN allows the user to run commands with an End User or Administrator permission level. When the permission system is enabled, LOGIN enables running commands with the User or Administrator permission level. When set, login must be performed upon each connection. It is not mandatory to enable the permission system in order to use the device. In each device, some connections allow logging in to different levels. Some do not work with security at all. Connection may logout after timeout.	<b>COMMAND</b> #LOGIN_login_level,password<CR> <b>FEEDBACK</b> ~nn@LOGIN_login_level,password_ok<CR><LF> or ~nn@LOGIN_err_004<CR><LF> (if bad password entered)	login_level – Level of permissions required (User or Admin) password – Predefined password (by PASS command). Default password is an empty string	Set the protocol permission level to Admin (when the password defined in the PASS command is 33333): #LOGIN_admin,33333<CR>>
LOGIN?	Get current protocol permission level. <i>ⓘ</i> The permission system works only if security is enabled with the "SECUR" command. For devices that support security, LOGIN allows the user to run commands with an End User or Administrator permission level. In each device, some connections allow logging in to different levels. Some do not work with security at all. Connection may logout after timeout.	<b>COMMAND</b> #LOGIN?_<CR> <b>FEEDBACK</b> ~nn@LOGIN_login_level<CR><LF>	login_level – Level of permissions required (User or Admin)	Get current protocol permission level: #LOGIN?_<CR>
LOGOUT	Cancel current permission level. <i>ⓘ</i> Logs out from End User or Administrator permission levels to Not Secure.	<b>COMMAND</b> #LOGOUT<CR> <b>FEEDBACK</b> ~nn@LOGOUT_ok<CR><LF>		#LOGOUT<CR>
MODEL?	Get device model. <i>ⓘ</i> This command identifies equipment connected to KIT-400T and notifies of identity changes to the connected equipment. The Matrix saves this data in memory to answer REMOTE-INFO requests.	<b>COMMAND</b> #MODEL?_<CR> <b>FEEDBACK</b> ~nn@MODEL_model_name<CR><LF>	model_name – String of up to 19 printable ASCII chars	Get the device model: #MODEL?_<CR>
MUTE	Set audio mute.	<b>COMMAND</b> #MUTE_out_index,mute_mode<CR> <b>FEEDBACK</b> ~nn@MUTE_out_index,mute_mode<CR><LF>	out_index – Number that indicates the specific output: 1 – AUDIO OUT mute_mode – On/Off 0 – Off 1 – On	Set Output 1 to mute: #MUTE_1,1<CR>

Function	Description	Syntax	Parameters/Attributes	Example
MUTE?	Get audio mute.	<b>COMMAND</b> #MUTE?_out_index<CR> <b>FEEDBACK</b> ~nn@MUTE_out_index,mute_mode<CR><LF>	<b>out_index</b> – Number that indicates the specific output: 1 – AUDIO OUT <b>mute_mode</b> – On/Off 0 – Off 1 – On	Get mute status of output 1 #MUTE_1?<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).	<b>COMMAND</b> #NAME_machine_name<CR> <b>FEEDBACK</b> ~nn@NAME_machine_name<CR><LF>	<b>machine_name</b> – 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).	<b>COMMAND</b> #NAME?_<CR> <b>FEEDBACK</b> ~nn@NAME_machine_name<CR><LF>	<b>machine_name</b> – 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.	<b>COMMAND</b> #NAME-RST<CR> <b>FEEDBACK</b> ~nn@NAME-RST_ok<CR><LF>		Reset the machine name (S/N last digits are 0102): #NAME-RST_kramer_0102<CR>
NET-CONFIG	Set a network configuration.  ⓘ Parameters [DNS1] and [DNS2] are optional.  ⓘ For Backward compatibility, the <b>id</b> parameter can be omitted. In this case, the Network ID, by default, is 0, which is the Ethernet control port.  ⓘ If the gateway address is not compliant to the subnet mask used for the host IP, the command will return an error. Subnet and gateway compliancy specified by RFC950.	<b>COMMAND</b> #NET-CONFIG_netw_id,net_ip,net_mask,gateway,[dns1],[dns2]_<CR> <b>FEEDBACK</b> ~nn@NET-CONFIG_netw_id,net_ip,net_mask,gateway<CR><LF>	<b>netw_id</b> – 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.... <b>net_ip</b> – Network IP <b>net_mask</b> – Network mask <b>gateway</b> – Network gateway	Set the device network parameters to IP address 192.168.113.10, net mask 255.255.0.0, and gateway 192.168.0.1: #NET-CONFIG_0,192.168.113.10,255.255.0.0,192.168.0.1<CR>
NET-CONFIG?	Get a network configuration.	<b>COMMAND</b> #NET-CONFIG?_netw_id<CR> <b>FEEDBACK</b> ~nn@NET-CONFIG_netw_id,net_ip,net_mask,gateway<CR><LF>	<b>netw_id</b> – 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.... <b>net_ip</b> – Network IP <b>net_mask</b> – Network mask <b>gateway</b> – Network gateway	Get network configuration: #NET-CONFIG?_id<CR>

Function	Description	Syntax	Parameters/Attributes	Example
NET-DHCP	<p>Set DHCP mode.</p> <p><b>i</b> 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 <b>NAME</b> 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><b>i</b> For Backward compatibility, the <b>id</b> parameter can be omitted. In this case, the Network ID, by default, is 0, which is the Ethernet control port.</p>	<p><b>COMMAND</b></p> <pre>#NET-DHCP_netw_id,dhcp_state&lt;CR&gt;</pre> <p><b>FEEDBACK</b></p> <pre>~nn@NET-DHCP_netw_id,dhcp_state&lt;CR&gt;&lt;LF&gt;</pre>	<p><b>netw_id</b> – 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><b>dhcp_state</b> –</p> <p>1 – Try to use DHCP. (If unavailable, use the IP address set by the factory or the <b>net-ip</b> command).</p>	<p>Enable DHCP mode for port 1, if available:</p> <pre>#NET-DHCP_1,1&lt;CR&gt;</pre>
NET-DHCP?	<p>Get DHCP mode.</p> <p><b>i</b> For Backward compatibility, the <b>id</b> parameter can be omitted. In this case, the Network ID, by default, is 0, which is the Ethernet control port.</p>	<p><b>COMMAND</b></p> <pre>#NET-DHCP?_netw_id&lt;CR&gt;</pre> <p><b>FEEDBACK</b></p> <pre>~nn@NET-DHCP?_netw_id,dhcp_mode&lt;CR&gt;&lt;LF&gt;</pre>	<p><b>netw_id</b> – 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><b>dhcp_mode</b> –</p> <p>0 – Do not use DHCP. Use the IP set by the factory or using the <b>net-ip</b> or <b>net-config</b> command.</p> <p>1 – Try to use DHCP. If unavailable, use the IP set by the factory or using the <b>net-ip</b> or <b>net-config</b> command.</p>	<p>Get DHCP mode for port 1:</p> <pre>#NET-DHCP?_1&lt;CR&gt;</pre>
NET-GATE	<p>Set gateway IP.</p> <p><b>i</b> 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.</p>	<p><b>COMMAND</b></p> <pre>#NET-GATE_ip_address&lt;CR&gt;</pre> <p><b>FEEDBACK</b></p> <pre>~nn@NET-GATE_ip_address&lt;CR&gt;&lt;LF&gt;</pre>	<p><b>ip_address</b> – Format: xxx.xxx.xxx.xxx</p>	<p>Set the gateway IP address to 192.168.0.1:</p> <pre>#NET-GATE_192.168.000.001&lt;CR&gt;</pre>
NET-GATE?	<p>Get gateway IP.</p> <p><b>i</b> A network gateway connects the device via another network and maybe over the Internet. Be aware of security problems.</p>	<p><b>COMMAND</b></p> <pre>#NET-GATE?_ip_address&lt;CR&gt;</pre> <p><b>FEEDBACK</b></p> <pre>~nn@NET-GATE?_ip_address&lt;CR&gt;&lt;LF&gt;</pre>	<p><b>ip_address</b> – Format: xxx.xxx.xxx.xxx</p>	<p>Get the gateway IP address:</p> <pre>#NET-GATE?_ip_address&lt;CR&gt;</pre>
NET-IP	<p>Set IP address.</p> <p><b>i</b> For proper settings consult your network administrator.</p>	<p><b>COMMAND</b></p> <pre>#NET-IP_ip_address&lt;CR&gt;</pre> <p><b>FEEDBACK</b></p> <pre>~nn@NET-IP_ip_address&lt;CR&gt;&lt;LF&gt;</pre>	<p><b>ip_address</b> – Format: xxx.xxx.xxx.xxx</p>	<p>Set the IP address to 192.168.1.39:</p> <pre>#NET-IP_192.168.001.039&lt;CR&gt;</pre>
NET-IP?	<p>Get IP address.</p>	<p><b>COMMAND</b></p> <pre>#NET-IP?_ip_address&lt;CR&gt;</pre> <p><b>FEEDBACK</b></p> <pre>~nn@NET-IP?_ip_address&lt;CR&gt;&lt;LF&gt;</pre>	<p><b>ip_address</b> – Format: xxx.xxx.xxx.xxx</p>	<p>Get the IP address:</p> <pre>#NET-IP?_ip_address&lt;CR&gt;</pre>
NET-MAC?	<p>Get MAC address.</p> <p><b>i</b> For backward compatibility, the <b>id</b> parameter can be omitted. In this case, the Network ID, by default, is 0, which is the Ethernet control port.</p>	<p><b>COMMAND</b></p> <pre>#NET-MAC?_id,mac_address&lt;CR&gt;</pre> <p><b>FEEDBACK</b></p> <pre>~nn@NET-MAC?_id,mac_address&lt;CR&gt;&lt;LF&gt;</pre>	<p><b>id</b> – 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><b>mac_address</b> – Unique MAC address. Format: XX-XX-XX-XX-XX-XX where X is hex digit</p>	<pre>#NET-MAC?_id,mac_address&lt;CR&gt;</pre>
NET-MASK	<p>Set subnet mask.</p> <p><b>i</b> For proper settings consult your network administrator.</p>	<p><b>COMMAND</b></p> <pre>#NET-MASK_net_mask&lt;CR&gt;</pre> <p><b>FEEDBACK</b></p> <pre>~nn@NET-MASK_net_mask&lt;CR&gt;&lt;LF&gt;</pre>	<p><b>net_mask</b> – Format: xxx.xxx.xxx.xxx</p>	<p>Set the subnet mask to 255.255.0.0:</p> <pre>#NET-MASK_255.255.000.000&lt;CR&gt;</pre>
NET-MASK?	<p>Get subnet mask.</p>	<p><b>COMMAND</b></p> <pre>#NET-MASK?_net_mask&lt;CR&gt;</pre> <p><b>FEEDBACK</b></p> <pre>~nn@NET-MASK?_net_mask&lt;CR&gt;&lt;LF&gt;</pre>	<p><b>net_mask</b> – Format: xxx.xxx.xxx.xxx</p>	<p>Get the subnet mask:</p> <pre>#NET-MASK?_net_mask&lt;CR&gt;</pre>

Function	Description	Syntax	Parameters/Attributes	Example
PASS	Set password for login level.  ① The default password is an empty string.	<b>COMMAND</b> #PASS_login_level,password<CR> <b>FEEDBACK</b> ~nn@PASS_login_level,password<CR><LF>	<b>login_level</b> – Level of login to set (End User or Administrator). <b>password</b> – Password for the login_level. Up to 15 printable ASCII chars	Set the password for the Admin protocol permission level to 33333: #PASS_admin,33333<CR>
PASS?	Get password for login level.  ① The default password is an empty string.	<b>COMMAND</b> #PASS?_login_level<CR> <b>FEEDBACK</b> ~nn@PASS_login_level,password<CR><LF>	<b>login_level</b> – Level of login to set (End User or Administrator). <b>password</b> – Password for the login_level. Up to 15 printable ASCII chars	Get the password for the Admin protocol permission level: #PASS?_admin<CR>
PRIORITY	Set input priority.	<b>COMMAND</b> #PRIORITY_layer_type,priority_1,priority_2..priority_3<CR> <b>FEEDBACK</b> ~nn@PRIORITY_layer_type,priority_1,priority_2..priority_3<CR><LF>	<b>layer_type</b> – Layer Enumeration 1 – Video 2 – Audio <b>priority</b> – Priority of inputs (1-n) for video layer (1 is the highest priority): priority 1 – for IN 1 (1,2, or 3) priority 2 – for IN 2 (1, 2 or 3) priority 3 – for IN 3 (1, 2 or 3) for audio layer (1 is the highest priority): priority 1 – for embedded audio (1 or 2) priority 2 – for AUDIO IN (1 or 2)	Set the video input priority of PC In as the highest priority: #PRIORITY_1,2,3,1<CR>
PRIORITY?	Get input priority.	<b>COMMAND</b> #PRIORITY?_layer_type<CR> <b>FEEDBACK</b> ~nn@PRIORITY_layer_type,priority_1,priority_2..priority_n<CR><LF>	<b>layer_type</b> – Layer Enumeration 1 – Video 2 – Audio <b>priority</b> – Priority of inputs (1-n) for video layer (1 is the highest priority): priority 1 – for IN 1 (1,2, or 3) priority 2 – for IN 2 (1, 2 or 3) priority 3 – for IN 3 (1, 2 or 3) for audio layer (1 is the highest priority): priority 1 – for embedded audio (1 or 2) priority 2 – for AUDIO IN (1 or 2)	Get video input priority: #PRIORITY?_1<CR>
PROT-VER?	Get device protocol version.	<b>COMMAND</b> #PROT-VER?_<CR> <b>FEEDBACK</b> ~nn@PROT-VER_3000:version<CR><LF>	<b>version</b> – XX.XX where X is a decimal digit	Get the device protocol version: #PROT-VER?_<CR>
RESET	Reset device.  ① 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.	<b>COMMAND</b> #RESET<CR> <b>FEEDBACK</b> ~nn@RESET_ok<CR><LF>		Reset the device: #RESET<CR>
ROUTE	Set layer routing.  ① This command replaces all other routing commands.	<b>COMMAND</b> #ROUTE_layer_type,out_index,in_index<CR> <b>FEEDBACK</b> ~nn@ROUTE_layer_type,out_index<CR><LF>	<b>layer_type</b> Layer Enumeration 1 – Video 3 – Data <b>out_index</b> for video layer: 1 – HDBT OUT for video layer: 1 – HDBT OUT 2 – KIT-400T data port 3 – KIT-400T internal control port <b>in_index</b> – Source id for video layer: 1 – IN 1 2 – IN 2 3 – IN 3 for video layer: 1 – HDBT OUT 2 – KIT-400T data port 3 – KIT-400T internal control port	Route video IN 2 to video HDBT OUT: #ROUTE_1,1,2<CR>
ROUTE?	Get layer routing.  ① This command replaces all other routing commands.	<b>COMMAND</b> #ROUTE?_layer_type,out_index<CR> <b>FEEDBACK</b> ~nn@ROUTE_layer_type,out_index,in_index<CR><LF>	<b>layer_type</b> Layer Enumeration 1 – Video 3 – Data <b>out_index</b> for video layer: 1 – HDBT OUT for video layer: 1 – HDBT OUT 2 – KIT-400T data port 3 – KIT-400T internal control port <b>in_index</b> – Source id for video layer: 1 – IN 1 2 – IN 2 3 – IN 3 for video layer: 1 – HDBT OUT 2 – KIT-400T data port 3 – KIT-400T internal control port	Get the layer routing: #ROUTE?_1,1<CR>



Function	Description	Syntax	Parameters/Attributes	Example
SECUR	Start/stop security.   The permission system works only if security is enabled with the "SECUR" command.	<b>COMMAND</b> #SECUR_security_state<CR> <b>FEEDBACK</b> ~nn@SECUR_security_state<CR><LF>	<b>security_state</b> – Security state 0 – OFF (disables security) 1 – ON (enables security)	Enable the permission system: #SECUR_0<CR>
SECUR?	Get current security state.   The permission system works only if security is enabled with the "SECUR" command.	<b>COMMAND</b> #SECUR?_<CR> <b>FEEDBACK</b> ~nn@SECUR_security_state<CR><LF>	<b>security_state</b> – Security state 0 – OFF (disables security) 1 – ON (enables security)	Get current security state: #SECUR?_<CR>
SIGNAL?	Get input signal status.	<b>COMMAND</b> #SIGNAL?_in_index<CR> <b>FEEDBACK</b> ~nn@SIGNAL_in_index,status<CR><LF>	<b>in_index</b> – Number that indicates the specific input: 1 – IN 1 2 – IN 2 3 – IN 3 <b>status</b> – 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.	<b>COMMAND</b> #SN?_<CR> <b>FEEDBACK</b> ~nn@SN_serial_num<CR><LF>	<b>serial_num</b> – 14 decimal digits, factory assigned	Get the device serial number: #SN?_<CR>
TIME	Set device time and date.   The year must be 4 digits.  The device does not validate the day of week from the date.  Time format - 24 hours.  Date format - Day, Month, Year.	<b>COMMAND</b> #TIME_day_of_week,date,data<CR> <b>FEEDBACK</b> ~nn@TIME_day_of_week,date,data<CR><LF>	<b>day_of_week</b> – One of {SUN,MON,TUE,WED,THU,FRI,SAT} <b>date</b> – Format: DD-MM-YYYY. <b>data</b> – Format: hh:mm:ss where hh = hours mm = minutes ss = seconds	Set device time and date to December 5, 2018 at 2:30pm: #TIME_mon_05-12-2018,14:30:00<CR>
TIME?	Get device time and date.   The year must be 4 digits.  The device does not validate the day of week from the date.  Time format - 24 hours.  Date format - Day, Month, Year.	<b>COMMAND</b> #TIME?_<CR> <b>FEEDBACK</b> ~nn@TIME_day_of_week,date,data<CR><LF>	<b>day_of_week</b> – One of {SUN,MON,TUE,WED,THU,FRI,SAT} <b>date</b> – Format: YYYY/MM/DD where YYYY = Year MM = Month DD = Day <b>data</b> – Format: hh:mm:ss where hh = hours mm = minutes ss = seconds	Get device time and date: #TIME?<CR>
TIME-LOC	Set local time offset from UTC/GMT.   If the time server is configured, device time calculates by adding UTC_off to UTC time (that it got from the time server) + 1 hour if daylight savings time is in effect.  TIME command sets the device time without considering these settings.	<b>COMMAND</b> #TIME-LOC_utc_off,dst_state<CR> <b>FEEDBACK</b> ~nn@TIME-LOC_utc_off,dst_state<CR><LF>	<b>utc_off</b> – Offset of device time from UTC/GMT (without daylight time correction) <b>dst_state</b> – Daylight saving time state 0 – no daylight saving time 1 – daylight saving time	Set local time offset to 3 with no daylight-saving time: #TIME-LOC_3,0<CR>
TIME-LOC?	Get local time offset from UTC/GMT.   If the time server is configured, device time calculates by adding UTC_off to UTC time (that it got from the time server) + 1 hour if daylight savings time is in effect.  TIME command sets the device time without considering these settings.	<b>COMMAND</b> #TIME-LOC?_<CR> <b>FEEDBACK</b> ~nn@TIME-LOC_utc_off,dst_state<CR><LF>	<b>utc_off</b> – Offset of device time from UTC/GMT (without daylight time correction) <b>dst_state</b> – Daylight saving time state 0 – no daylight saving time 1 – daylight saving time	Get local time offset from UTC/GMT: #TIME-LOC?<CR>
TIME-SRV	Set time server.   This command is needed for setting UDP timeout for the current client list.	<b>COMMAND</b> #TIME-SRV_mode,time_server_ip,sync_hour<CR> <b>FEEDBACK</b> ~nn@TIME-SRV_mode,time_server_ip,sync_hour,server_status<CR><LF>	<b>mode</b> – On/Off 0 – Off 1 – On <b>time_server_ip</b> – Time server IP address <b>sync_hour</b> – Hour in day for time server sync <b>server_status</b> – On/Off	Set time server with IP address of 128.138.140.44 to ON: #TIME-SRV_1,128.138.140.44,0,1<CR>

Function	Description	Syntax	Parameters/Attributes	Example
TIME-SRV?	Get time server.  ⓘ This command is needed for setting UDP timeout for the current client list.	<b>COMMAND</b> #TIME-SRV?_<CR>  <b>FEEDBACK</b> ~nn@TIME-SRV_mode,time_server_ip,server_status<CR><LF>	<b>mode</b> – On/Off 0 – Off 1 – On <b>time_server_ip</b> – Time server IP address <b>sync_hour</b> – Hour in day for time server sync <b>server_status</b> – On/Off	Get time server: #TIME-SRV?<CR>
VERSION?	Get firmware version number.	<b>COMMAND</b> #VERSION?_<CR>  <b>FEEDBACK</b> ~nn@VERSION_firmware_version<CR><LF>	<b>firmware_version</b> – XX.XX.XXXX where the digit groups are: major.minor.build version	Get the device firmware version number: #VERSION?_<CR>
VGA-PHASE	Set ADC (VGA) sampling phase.  ⓘ Response answers with absolute value after decreasing or increasing value.	<b>COMMAND</b> #VGA-PHASE_in_id,value<CR>  <b>FEEDBACK</b> ~nn@VGA-PHASE_in_id,value<CR><LF>	<b>in_id</b> – Indicates the ID of the input: 3 – IN 3 <b>value</b> – Phase parameter in LSB units (1 to 30) ++ increase current value – decrease current value	Increase the current value of the ADC (VGA) sampling phase: #VGA-PHASE_3,++<CR>
VGA-PHASE?	Get ADC (VGA) sampling phase.  ⓘ Response answers with absolute value after decreasing or increasing value.	<b>COMMAND</b> #VGA-PHASE?_in_id<CR>  <b>FEEDBACK</b> ~nn@VGA-PHASE_in_id,value<CR><LF>	<b>in_id</b> – Indicates the ID of the input: 3 – IN 3 <b>value</b> – Phase parameter in LSB units (1 to 30) ++ increase current value – decrease current value	Get ADC (VGA) sampling phase: #VGA-PHASE?_3<CR>
VMUTE	Set enable/disable video on output.  ⓘ Video mute parameter 2 (blank picture) is not supported.	<b>COMMAND</b> #VMUTE_out_index,flag<CR>  <b>FEEDBACK</b> ~nn@VMUTE_out_index,flag<CR><LF>	<b>out_index</b> – Number that indicates the specific output: 1-N (N= the total number of outputs) <b>flag</b> – Video Mute 0 – Video disabled 1 – Video enabled 2 – Blank picture	Disable the video output on OUT 2: #VMUTE_2,0<CR>
VMUTE?	Get video on output status.  ⓘ Video mute parameter 2 (blank picture) is not supported.	<b>COMMAND</b> #VMUTE?_out_index<CR>  <b>FEEDBACK</b> ~nn@VMUTE_out_index,flag<CR><LF>	<b>out_index</b> – Number that indicates the specific output: 1 – HDBT OUT <b>flag</b> – Video Mute 0 – Video disabled 1 – Video enabled 2 – Blank picture	Get video on output status: #VMUTE?_2<CR>

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# 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_TIMEOUT	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