



KRAMER KDS-EN6 Video Encoder User Guide

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API Guide
MODEL:
KDS-EN6, KDS-DEC6
Application Programming Interface



2900- 301422

Rev:



1

P/N:



SAFETY WARNING

Disconnect the unit from the power supply before opening and servicing

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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 video, audio, presentation, and broadcasting professionals on a daily basis. In recent years, we have redesigned and upgraded most of our line, making the best even better!

Overview

This document describes the commands that can be used for the KDS-6 console for managing USB. KDS-6 uses Linux OS and the console is operated by a BusyBox shell. API supports KDS-6 firmware versions 7.2 and above.

Defaults:

- Telnet port: 24.
- User name: "admin"
- Password: "admin" to log in.

Terms

- Commands starting with "\$" – Console commands executed under the Linux shell console. The default value of multicast IP (multicast_ip) is 225.0.10x.xxx. Please use this multicast_ip value.
- The 'ast_send_event -1 xxx' command has a new shortcut named 'e'. All of the following 'ast_send_evt -1 xxx' commands can be replaced with the shortcut command like 'e xxx'. They are exactly the same.
- USB (USB over IP) extension function. A 'transparent' type of 'USB over IP' extension function. Comparing to 'KMoIP' which is 'emulation' type.
- KMoIP (Keyboard/Mouse over IP) extension function. A USB extension, but uses 'emulation' technology instead of 'transparent' USB over IP, optimized for USB Interrupt mode of work, guarantee quick responses.

- Host – KDS-EN6
- Client – KDS-DEC6

Command Syntax Conventions

The following table describes the syntax used with the commands in this document.

Convention	Description
boldface	Commands and keywords.

<i>italic</i>	Command input that is supplied by you.
[x]	Keywords or parameters that appear within square brackets are optional.
{x}	Keywords or parameters within braces must be entered.
x y	Keywords or parameters separated by a vertical bar require you to choose one option.
x ly	Keywords or parameters separated by a double vertical bar allow you to choose any or all the options



All commands and parameters are case-sensitive.

“/ # “ in a command example refers to a command prompt and is not part of the command.

To access the console using Telnet

Every KDS-6 host/client FW has Telnet and a Telnet client built in. A developer can use KDS6's Telnet client to connect to any other KDS-6 board or write their own program using Telnet protocol to connect to any KDS-6 board through the Ethernet network.



- Default is Telnet port 24.
- Use “root” to log in.
- No password is required.

Astparam APIs Overview

KDS-6 series firmware includes many firmware features that are configurable. Most of the configuration is done by the “Configuration APIs” (called “Astparam”). Astparam is the console command to access these system configurations. We also name this system configuration Astparam.

Astparam can be saved in flash ROM. So that system configuration is not lost after a system power failure.

The Astparam format is simply a key=value string pair. Both the “key” and “value” are ANSI strings and case-sensitive. The firmware decides how to use it. The firmware does not validate the Astparam, so any typed error could cause unexpected results.

All configuration modifications are saved in RAM until astparam save command is called.

Accessing Astparam

The most fundamental and powerful way to access Astparam is through the Astparam Console API command. Most alternative approaches are just a wrap of Astparam commands. To learn more about Console API commands and how to use console APIs, see Console APIs on page 5) or reference the “Console APIs v2” document.

To use Astparam:

\$ astparam OPTIONS [KEY] [VALUE]

OPTIONS:

- g: read from RW partition cache file. [KEY] is required.
- s: write to RW partition cache file (not saved to flash ROM yet). [KEY] and [VALUE] are required. If [VALUE] is empty the [KEY] is removed.
- flush: clear all settings in RW partition cache file including random generated MAC address. “./astparam save” is needed to clear all settings in flash ROM.
- dump: dump all parameters in RW partition cache file.
- save: save all parameters in RW partition cache file into flash ROM.

Start/Stop KMoIP [KDS-DEC6]

In order to manage KMoIP use np_kmoip Astparam:

Key	Description	Value (b
no_kmoip	Enable/disable KMoIP function.	y: disable KMoI n: enable KMoI

Syntax [Start]

```
>>astparam s no_kmoip n
```

Syntax [Stop]

```
>>astparam s no_kmoip y
```

Usage Information:

- This command is for KMoIP.
- This command is used for runtime control.

Console APIs

Switch Channel [KDS-DEC6]

Command client to connect to a specified channel. For API backward compatibility and easier usage, this command has 3 syntax formats. Channel can be specified by channel number (select) or host's IP address (host-IP-address).

Syntax [legacy, refresh current connection] e e_reconnect

Syntax [specify channel, apply to all services] e e_reconnect:: {ch-select|host-ip-addr}

Parameters

- **ch-select:**
 - Enter 4 digit decimal numbers from 0000 to 9999. It must be in 4 digit format prepending with 0.
Example: 0000, 0001, 0100, 1000, 3456, 1342, 8888, 9999....
 - Default value: Determined from on-board 4-bits DIP switch. Since it is 4-bits 0 or 1, it can only represent 16 channels in total. They are 0000, 0001, 0010, 0011, 0100, 0101,..., 1111. Default values are also interpreted as decimal numbers instead of binary values.
- **host-IP-address:**

- Enter an IP address in dotted-decimal format. Used to specify the host's IP address to connect to.

Example: 169.254.11.22

- `{{Z}}{v|u|a| }{ }`:

Used to specify which function to apply.

v: video over IP

u: USB over IP

a: Audio over IP

Z: all features except video over IP

Usage Information

- The command supports ch-select from 0000 to 9999, which means there are a maximum of 10000 host channels that can be used.
- To simplify the configuration process, FW will automatically map
- 'channel' to 'multicast IP'. Users don't have to specify 'multicast IP'.
- For a trick to improve video switching time, please see Ex5 in the following examples section.

Version History

FW >= A7.0.0

Examples

Ex1: Start to connecting all services to the 'current' channel. 'current' channel is by default got from onboard 4-bits DIP switch. Only this command triggers FW to re-read the 4-bits DIP switch value.

```
/ # e e_reconnect
```

```
/ #
```

Ex2: Start connect all services to channel '9810'.

```
/ # e e_reconnect::9810
```

```
/ #
```

Ex3: Above command equals to following command:

```
/ # e e_reconnect::9810::Z
```

```
/ #
```

Ex4: Start to connect 'video over IP' to channel '9810'. The others use the 'current' channel.

```
/ # e e_reconnect::9810::v
```

```
/ #
```

Ex5: Use following command (without specifying 'functions') can switch video under only 1 second.

```
/ # e e_reconnect::1222
```

```
/ #
```

Ex8: Connect 'USB over IP' to '169.254.2.3'

```
/ # e e_reconnect::169.254.2.3::u
```

```
/ #
```



"Switch to X", where X=Channel number command is a legacy command being used for switch channel. It is still being supported but we strongly encourage using the e_reconnect command instead. Its support will be discontinued in the next KDS-6 major release.

Stop Link [KDS-DEC6]

Used to stop services.

Syntax [stop all] e e_stop_link

Usage Information

- All services will be stopped.

- Client's 'e_stop_link' state will NOT persist between client reboot.

Version History

FW >= A7.0.0

Examples

Ex1: Stop services.

```
/ # e e_stop_link
```

```
/ #
```

Get Video Manager State

Syntax Imparam g STATE

Result

- Encoder
- s_init: The system is under initialization.
- s_idle: System is idle. Services are stopped.
- s_attaching: Services are started, but no client attached or no video source.
- s_srv_on: Services are started.
- s_error: Fatal error.
- Decoder
- s_init: The system is under initialization.
- s_idle: System is idle. Services are stopped.
- s_srv_on: Services are started.
- s_error: fatal error.

Example

Ex1: Get video manager current state.

```
/# Imparam g STATE
```

```
s_srv_on
```

```
/#
```

Get Attached Client IP [KDS-EN6]

Syntax Imparam g USB_CLIENT_IP

Result

- xxx.xxx.xxx.xxx: Return the IP address of last requested USBolP client. If there is no one requested, it returns '0.0.0.0'.

Usage Information

Version History

FW >= A7.0.0

Examples

Ex1: Get current USBolP status. The current requested client's IP is '169.254.10.167'.

```
/ # Imparam g USB_CLIENT_IP
```

```
169.254.10.167/ #
```

Example

```

/ # echo "connect to AV on channel 2"
connect to AV on channel 2
/ # e a_reconnect::0002::av
/ # echo "check the state of AV connection"
check the state of AV connection
/ # state=$(astparam g STATE)
/ # echo $state
s_srv_on
/ # echo "check kvm status that is OFF"
check kvm status that is OFF
/ # state=$(astparam g no_kmoip)
/ # echo $state
#
/ # echo "switch kvm on on channel 2"
switch kvm on on channel 2
/ # echo "switch kvm on on channel 2"
switch kvm on on channel 2
/ # astparam s no_kmoip n:astparam save
/ #
/ # state=$(astparam g no_kmoip)
/ # echo $state
#
/ # echo "switch kvm OFF on channel 2"
switch kvm OFF on channel 2
/ # astparam s no_kmoip y:astparam save
/ # echo $state
#
/ # state=$(astparam g no_kmoip)
/ # echo $state
#
/ # astparam s no_kmoip n
/ # state=$(astparam g no_kmoip)
/ # echo $state
#
/ # astparam s no_kmoip y
/ # state=$(astparam g no_kmoip)
/ # echo $state
#
/ #
/ # echo "Stop AV service"
Stop AV service
/ # e a_stop_link
/ # state=$(astparam g STATE)
/ # echo $state
s_idle
/ # astparam s no_kmoip n

```

Astparam APIs



Generic

Key	Description	Value	Host/Client
multicast_on	Configure casting mode	y : Multicast mode n : Unicast mode (default)	H/C
pwr_led_type		share_usb: (default)	H/C
en_log	'y' show debug message on debug console.	y : Display (default) n : Hide	H/C
ui_show_text	'y' to display diagnostic information on the bottom of GUI. 'n' to hide it.	y : Display (default) n : Hide	C

IP Network Setting

Key	Description	
-----	-------------	--

ip_mode		tatic: DHCP: autoip: (default)	H/C
ipaddr		s	H/C
netmask			H/C
gatewayip			H/C
hostname_prefix			H/C
hostnamebydipswitch	<p>Use default hostname_id based on 4- bits DIP switch.</p> <p>When “hostnamebydipswitch” is “y”, “hostname_id”'s default value is the value of “ch_select” where default get from on-board 4-bits DIP switch.</p>	y: (host default) n: (client default)	H/C
hostname_id	<p>Overwrite “hostnamebydipswitch”.</p> <p>[FW >= A7.0.0] In FW < A7.0.0, client maps ch_select to host's hostname in order to find and connect to host. In FW</p> <p>Use a new approach to discover the host's IP address and the host's hostname is no more bonded to the channel resolution process. This means the host's Astparam, hostname_id, can be any value as the user's wish in FW >= 7.2. However, FW by default will still update hostname based on ch_select. To set hostname_id other than ch_select, please set 'hostnamebydipswitch' to 'n'.</p>		H/C

Key	Description
hostname_tx_middle	<p>[FW >= 7.2] The default hostname of a host is 'ast3-gateway XXXX's. This the parameter is used to change the 'gateway' part.</p> <p> Both host and client need the same setting.</p>
hostname_rx_middle	<p>[FW >= 7.2] The default hostname of a host is 'ast3clientXXXXXXXXXXXXX'. This parameter is used part.</p> <p> Both host and client need the same setting.</p>
ch_select	<p>Default channel value. Default value from on-board 4-bits DIP switch.</p> <p>[FW >= 7.2][client] Due to the support of free routing, this value is only used as the default value of following 'ch_select_x' parameters:</p> <p>ch_select_v: video ch_select_u: USB ch_select_a: audio ch_select_r: IR ch_select_s: Serial ch_select_p: GPIO/Push Button</p> <p>[FW >= 7.2] ch_select_c: CEC</p> <p>Change 'ch_select' won't affect anything if 'ch_select_x' is already specified.</p>
ch_select_v ch_select_u ch_select_a ch_select_r ch_select_s ch_select_p ch_select_c	<p>Like 'ch_select' but for specific services.</p> <p>Default value from 'ch_select':</p> <p>ch_select_v: video ch_select_u: USB ch_select_a: audio ch_select_r: IR ch_select_s: Serial ch_select_p: GPIO/Push Button ch_select_c: CEC</p>
multicast_leave_force	<p>[FW >= 7.2] Auto send IGMP to leave packet when received multicast packets that are not interested in this feature. However, DO NOT use a value that is too small. The smaller the value the higher the default value should be good to go. The specified time interval is used to specify the minimum interval.</p>

Video over IP

Key	Description
v_output_timing_convert	Force-specific video output timing. Examples: 00000000: Pass-Through 80000010: Full HD 1080p60 8000001F: Full HD 1080p50 8000005F: Ultra HD 2160p30 8000005E: Ultra HD 2160p25 80000004: HD 720p60 81004048: WXGA 1366×768@60 81004021: WXGA+ 1440×900@60 81004032: WUXGA 1920×1200@60 8100401D: SXGA+ 1400×1050@60
v_src_unavailable_timeout	Wait for a v_src_unavailable_timeout ms before entering power save. Set to '-1' means never timeout.
v_hdmi_hdr_mode	
v_frame_rate	Used to control the frame rate of video encode. Default set to '0' means 'no limitation' use best to limit the maximum video encode framerate. Valid range: 0,1,2,...,60. Frame rate = (v_frame_rate / 60) * 60. Set to '30' under 1080p60Hz: Frame rate = (30/60) * 60 = 30 FPS
v_hdmi_force_rgb_output	'v_hdmi_force_rgb_output' is used to change this behavior. Default is '5'. You can use 'osd_pic_on.sh' under 2160p video source. Set to '1' to use YUV format under the 2160p case. Which can get better picture quality. Set to '0' means 'pass-through'. The client will output the same color format as the Host input like 'video fast switching' and 'osd_pic_on.sh'.

Video Wall

Key	Description
en_video_wall	Enable video wall feature. Please also check the value of Astparam, web_ui_cfg, for the video wall Web UI.
vw_rotate	Clock-wise rotate output picture. Console API: echo 3 >/sys/devices/platform/display/vw_
vw_stretch_type	Video wall stretching type: 1: Stretch out 2: Fit in
vw_ver	Specify video wall control APIs version: 1: Default. Specify monitor layout and auto calculate coordinate. 2: Manually specify coordinate. Easier for mosaic style video wall configuration. Following Astparam will be used when 'vw_ver' is '2': <ul style="list-style-type: none"> • vw_v2_x1 • vw_v2_y1 • vw_v2_x2

HDCP

Key	Description
hdcp_always_on	Always enable HDCP 1.4
hdcp_always_on_22	Always enable HDCP 2.2
v_reject_hdcp	Don't accept HDCP video sources.

Audio

Key	Description
a_analog_in_vol	<p>Set analog audio's input volume. Range from 0 to 100 %.</p> <p>Default value '-1' means use driver built-in default value.</p> <p>This setting requires system reset to take effect. To runtime change the volume, please use following command:</p> <pre>echo [value] > /sys/devices/platform/150 0_i2s/analog_in_vol</pre>
a_analog_out_vol	<p>Set analog audio's output volume. Range from 0 to 100 %.</p> <p>Default value '-1' means use driver built-in default value.</p> <p>This setting requires system reset to take effect. To runtime change the volume, please use following command:</p> <pre>echo [value] > /sys/devices/platform/150 0_i2s/analog_out_vol</pre>

IR over IP

Key	Description
no_ir	This is a global IR over IP enable/disable setting.
ir_guest_on	Enable IR guest mode feature
ir_sw_decode	Enable IR software decode feature
ir_sw_decode_nec_cfg	<p>NEC remote control configuration of IR software decode feature The format is:</p> <p>[device address]_[code for 0]_[code for 1]_[code for 2]..._[code for 8]_[code for 9]</p> <p>each variable is a decimal number and the valid device address is 0~65535</p> <p>If the device address is 65535 (default), IR software decode function only displays decoded device address and button code. This is for remote control learning purposes.</p>

Serial over IP

Key	Description	Value	Host/ Client
no_soip		y: Disable SoIP (default) n: Enable SoIP	H/C
soip_type2 [FW < 7.2] soip_type [FW >= 7.2]	Specify Serial over IP operating type. [FW >= 7.2] Introduced new 'soip_type'. It will overwrite 'soip_type2's setting if defined. Otherwise, 'soip_type's default value comes from the setting of 'soip_type2'.	y: Use type 2 (default) n: Use type 1	H/C
		1: Use type 1 2: Use type 2 (default) 3: Use type 3	H/C
soip_guest_on		y: n: (default)	H/C
sO_baudrate		115200-8n1	H/C
soip_type2_token_timeout soip_token_timeout	For type 2 only.	1,2,3... seconds	H/C
	For type 2 and type 3. Default value from 'soip_type2_token_timeout'.		H/C
ch_select_soip2 ch_select_s	Default value from from 'ch select'.	N/A	C
	Default SoIP channel.		

CEC over IP

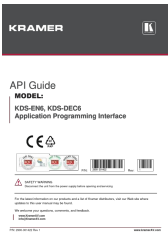
Key	Description	Value	Host/ Client
no_cec	This is a global CEC over IP enable/disable the setting. CEC extension and guest mode are both activated if CEC over IP is enabled.	y: Disable CEC over IP n: Enable CEC over IP (default)	H/C
cec_drv_option	32bits bitmap CEC driver options to tweak driver behavior. Default value is 0. 0x00000001: Disable CEC extension	0: (default)	H/C



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KDS-EN6, KDS-DEC6 – Astparam APIs

Documents / Resources

	KRAMER KDS-EN6 Video Encoder [pdf] User Guide KDS-EN6, KDS-DEC6, Video Encoder
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