KRAMER

API Guide

MODEL:

KDS-EN6, KDS-DEC6
Application Programming Interface

C E

22
PAP

ISO 9001   ISO 14001   OHSAS 18001

P/N: 2900-301422   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.

www.KramerAV.com
info@KramerAV.com

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!

Overview

This document describes the commands that can be used for 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_evnt -1 xxx' commands can be replaced with the shortcut command like 'e xxx'. They are exactly the same.

- **USBoIP** (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' USBoIP, optimized for USB Interrupt mode of work, guarantee quick responses.

- Host - KDS-EN6

- Client – KDS-DEC6

Command Syntax Conventions

Following table describes the syntax used with the commands in this document.

Convention	Description
boldface	Commands and keywords.
italic	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||y	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 KDS-6'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 these system configuration as 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 (bold is FW default)	Decoder/Encoder
no_kmoip	Enable/disable KMoIP function.	**y**: disable KMoIP **n**: enable KMoIP	Decoder/Encoder

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 (*ch-select*) or host's ip address (*host-ip-addr*).

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 number 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 number instead of binary value.

- **host-ip-addr:**

  - 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

- Command supports *ch-select* from 0000 to 9999, which means there are maximum 10000 host channels can be used.

- To simplify 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 following examples section.

Version History

FW >= A7.0.0

Examples

Ex1: Start connect all services to 'current' channel. 'current' channel is by default got from on-board 4-bits DIP switch. Only this command triggers FW to re-read 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 connect 'video over IP' to channel '9810'. The others use '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
/ #
```

ⓘ   "Switchto X", where X=Channel number command is a legacy command being used for switch channel. It is still being supported but we strongly encourage to use 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 lmparam g STATE

Result

- Encoder

  - **s_init**: 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**: 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.

```
/# lmparam g STATE
s_srv_on
/#
```

Get Attached Client IP [KDS-EN6]

Syntax lmparam g USB_CLIENT_IP

Result

- xxx.xxx.xxx.xxx: Return the IP address of last requested USBoIP 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 USBoIP status. Current requested client's IP is '169.254.10.167'.

```
/ # lmparam g USB_CLIENT_IP
169.254.10.167/ #
```

Example

```
/ # echo "connect to AV on channel 2"
connect to AV on channel 2
/ # e e_reconnect::0002::av
/ # echo "check the state of AV connection"
check the state of AV connection
/ # state=$(lmparam 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 $state
n
/ # echo "sitch kvm on on channel 2"
sitch kvm on on channel 2
/ # echo "switch kvm on on channel 2"
switch kvm on on channel 2
/ # astparam s no_kmoip n;astparam save
/ #
/ # state=$(astparam g no_kmoip)
/ # echo $state
n
/ # echo "switch kvm OFF on channel 2"
switch kvm OFF on channel 2
/ # astparam s no_kmoip y;astparam save
/ # echo $state
n
/ # state=$(astparam g no_kmoip)
/ # echo $state
y
/ # astparam s no_kmoip n
/ # state=$(astparam g no_kmoip)
/ # echo $state
n
/ # astparam s no_kmoip y
/ # state=$(astparam g no_kmoip)
/ # echo $state
y
/ #
/ # echo "Stop AV service"
Stop AV service
/ # e e_stop_link
/ # state=$(lmparam 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	Value	Host/Client
ip_mode		static: dhcp: autoip: (default)	H/C
ipaddr			H/C
netmask			H/C
gatewayip			H/C
hostname_prefix			H/C
hostnamebydipswitch	Use default hostname_id based on 4-bits DIP switch. 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.	**y**: (host default) **n**: (client default)	H/C
hostname_id	Overwrite "hostnamebydipswitch". [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 Use new approach to discover host's IP address and host's hostname is no more bonded to channel resolution process. Which means host's Astparam, hostname_id, can be any value as 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'.		H/C

Key	Description	Value	Host/ Client
hostname_tx_middle	[FW >= 7.2] The default host name of a host is 'ast3-gatewayXXXX'. This parameter is used to change the '-gateway' part. ⓘ Both host and client need the same setting.	Gateway (default)	H/C
hostname_rx_middle	[FW >= 7.2] The default host name of a host is 'ast3-clientXXXXXXXXXXX'. This parameter is used to change the '-client' part. ⓘ Both host and client need the same setting.	Client (default)	H/C
ch_select	Default channel value. Default value from on-board 4-bits DIP switch. [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: 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 [FW >= 7.2] ch_select_c: CEC Change 'ch_select' won't affect anything if 'ch_select_x' is already specified.		H/C
ch_select_v ch_select_u ch_select_a ch_select_r ch_select_s ch_select_p ch_select_c	Like 'ch_select' but for specific services. Default value from 'ch_select': 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		C
multicast_leave_force	[FW >= 7.2] Auto send IGMP leave packet when received multicast packets that are not interested in. Specify a value higher than 0 will enable this feature. However, DO NOT use a value that is too small. The smaller the value the higher load Ethernet switch may impact. Just use default value should be good to go. The specified time interval is used to specify the minimum interval of sending IGMP leave packet.	**8000**: Enable with 8000 ms interval (default) **0**: Disable	H/C

Video over IP

Key	Description	Value	Host/ Client
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 1366x768@60 81004021: WXGA+ 1440x900@60 81004032: WUXGA 1920x1200@60 8100401D: SXGA+ 1400x1050@60	**0**: Pass-Through (default)	C
v_src_unavailable_timeout	Wait for a v_src_unavailable_timeout ms before entering power save. Set to '-1' means never timeout.	**10000**: 10 seconds (default) **-1**: never timeout	C
v_hdmi_hdr_mode		**0**: HDR passthrough (default) **1**: Force HDR off	C
v_frame_rate	Used to control frame rate of video encode. Default set to '0' means 'no limitation' use best effort. Set to other value will limit the maximum video encode frame rate. Valid range: 0,1,2,...,60. Frame rate = (v_frame_rate / 60) * input refresh rate For example, set to '30' under 1080p60Hz: Frame rate = (30/60) * 60 = 30 FPS	**0**: Best effort (default)	H
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 2160p case. Which can get better picture quality but can't use 'osd_pic_on.sh' under 2160p. Set to '0' means 'pass-through'. Client will output the same color format as Host input. Note that doing this will break features like 'video fast switching' and 'osd_pic_on.sh'.	**5**: all output RGB (default) **1**: non-4K RGB, 4K YUV **0**: pass-through	C

Video Wall

Key	Description	Value	Host/Client
en_video_wall	Enable video wall feature. Please also check the value of Astparam, web_ui_cfg, for the video wall Web UI.	**y**: enable **n**: disable (default)	H/C
vw_rotate	Clock-wise rotate output picture. Console API: echo 3 > /sys/devices/platform/display/vw_rotate	**0**: No rotate (default) **3**: 180 degree **6**: 270 degree	C
vw_stretch_type	Video wall stretching type: 1: Stretch out 2: Fit in	**1**: Stretch out **2**: Fit in (default)	
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': • vw_v2_x1 • vw_v2_y1 • vw_v2_x2	**1**: Default **2**: v2. Specify coordinate	C

HDCP

Key	Description	Value	Host/Client
hdcp_always_on	Always enable HDCP 1.4	**y**: enable **n**: disable (default)	H/C
hdcp_always_on_22	Always enable HDCP 2.2	**y**: enable **n**: disable (default)	H/C
v_reject_hdcp	Don't accept HDCP video source.	**y**: enable **n**: disable (default)	H

Audio

Key	Description	Value	Host/Client
a_analog_in_vol	Set analog audio's input volume. Range from 0 to 100 %. Default value '-1' means use driver built in default value. This setting requires system reset to take effect. To runtime change the volume, please use following command: `echo [value] > /sys/devices/platform/1500_i2s/analog_in_vol`	-1,0,1,2 ~100	H/C
a_analog_out_vol	Set analog audio's output volume. Range from 0 to 100 %. Default value '-1' means use driver builtin default value. This setting requires system reset to take effect. To runtime change the volume, please use following command: `echo [value] > /sys/devices/platform/1500_i2s/analog_out_vol`	-1,0,1,2 ~100	H/C

IR over IP

Key	Description	Value	Host/Client
no_ir	This is a global IR over IP enable/disable setting.	**y**: Disable IRoIP **n**: Enable IRoIP (default)	H/C
ir_guest_on	Enable IR guest mode feature	**y**: Enable (default) **n**: Disable	H/C
ir_sw_decode	Enable IR software decode feature	**y**: Enable **n**: Disable (default)	H/C
ir_sw_decode_nec_cfg	NEC remote control configuration of IR software decode feature The format is: [device address]_[code for 0]_[code for 1]_[code for 2]_.._[code for 8]_[code for 9] each variable is decimal number and valid device address is 0~65535 If device address is 65535 (default), IR software decode function only displays decoded NEC result includes device address and button code. This is for remote control learning purpose.	65535_0_1_2_3_4_5_6_7_8_9	C

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
s0_baudrate		115200-8n1	H/C
soip_type2_token_timeout	For type 2 only.	1,2,3... seconds	H/C
soip_token_timeout	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 setting. CEC extension and guest mode are both activated if CECoIP is enabled.	**y**: Disable CECoIP **n**: Enable CECoIP (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