Kramer Electronics, Ltd.

Protocol 3000

Version 1.00 (Full Version)

Contents

Note that “Protocol 3000 compatible” does not imply that a machine includes all of the commands below. Each machine uses a sub-set of Protocol 3000, as per its needs.

1 Protocol 3000 Syntax

1.1 Host Message Format

Start	Address (optional)	Body	Delimiter
#	*Destination_id@*	**Message**	**CR**

1.1.1 Simple Command

Command string with only one command without addressing:

Start	Body	Delimiter
#	**Command** **SP** *Parameter_1,Parameter_2,…*	**CR**

1.1.2 Command String

Formal syntax with commands concatenation and addressing:

Start	Address	Body	Delimiter
#	*Destination_id@*	**Command_1** *Parameter1_1,Parameter1_2,…*| **Command_2** *Parameter2_1,Parameter2_2,…*| **Command_3** *Parameter3_1,Parameter3_2,…*|…	**CR**

1.2 Device Message Format

Start	Address (optional)	Body	delimiter
~	*Sender_id@*	**Message**	**CR** **LF**

1.2.1 Device Long Response

Echoing command:

Start	Address (optional)	Body	Delimiter
~	*Sender_id@*	**Command** **SP** **[***Param1 ,Param2 …***]** **result**	**CR** **LF**

CR = Carriage return (ASCII 13 = 0x0D)
LF = Line feed (ASCII 10 = 0x0A)
SP = Space (ASCII 32 = 0x20)

1.3 Command Terms

Command
A sequence of ASCII letters ('A'-'Z', 'a'-'z' and '-').
Command and parameters must be separated by at least one space.

Parameters
A sequence of alphameric ASCII characters ('0'-'9','A'-'Z','a'-'z' and some special characters for specific commands). Parameters are separated by commas.

Message string
Every command entered as part of a message string begins with a **message starting character** and ends with a **message closing character**.
Note: A string can contain more than one command. Commands are separated by a pipe ('|') character.

Message starting character
'#' – For host command/query
'~' – For machine response

Device address (Optional, for K-NET)
K-NET Device ID followed by '@'

Query sign
'?' follows some commands to define a query request.

All outputs sign
'*' defines all outputs.

Message closing character
CR – For host messages; carriage return (ASCII 13)
CRLF – For machine messages; carriage return (ASCII 13) + line-feed (ASCII 10)

Command chain separator character
When a message string contains more then one command, a pipe ('|') character separates each command.

Spaces between parameters or command terms are ignored.

1.4 Entering Commands

You can directly enter all commands using a terminal with ASCII communications software, such as HyperTerminal, Hercules, etc. Connect the terminal to the serial, Ethernet, or USB port on the Kramer device. To enter **CR** , press the Enter key. (**LF** is also sent but is ignored by command parser).

For commands sent from some non-Kramer controllers like Crestron, some characters require special coding (such as, /X##). Refer to the controller manual.

1.5 Command Forms

Some commands have short name syntax in addition to long name syntax to allow faster typing. The response is always in long syntax.

1.6 Command Chaining

Multiple commands can be chained in the same string. Each command is delimited by a pipe character ('|'). When chaining commands, enter the **message starting character** and the **message closing character** only once, at the beginning of the string and at the end.

Commands in the string do not execute until the closing character is entered.

A separate response is sent for every command in the chain.

1.7 Maximum String Length

64 characters

1.8 Backward Support

Protocol 2000 is transparently supported by Protocol 3000. You can switch between protocols using a switch protocol command from either platform.

2 Commands

2.1 Help Commands

Command	Syntax	Response
Protocol handshaking	#CR	~OK CRLF

2.2 Device Initiated Messages

Command	Syntax
Start message	Kramer Electronics LTD. , Device Model Version Software Version

Switcher actions:

Audio-video channel has switched (AFV mode)	AV IN>OUT
Video channel has switched (breakaway mode)	VID IN>OUT
Audio channel has switched (breakaway mode)	AUD IN>OUT

2.3 Result and Error Codes

	Syntax
Command ran successfully, no error.	COMMAND PARAMETERS OK

Protocol Errors:

Syntax error	ERR001
Command not available for this device	ERR002
Parameter is out of range	ERR003
Unauthorized access (command run without the matching login).	ERR004

2.4 Basic Routing Commands

Command	Syntax	Response
Switch audio and video	AV IN>OUT, IN>OUT, …	AV IN>OUT, IN>OUT,…RESULT
Switch video only	VID IN>OUT, IN>OUT, … Short form: V IN>OUT, IN>OUT, …	VID IN>OUT, IN>OUT, …RESULT

Note:
When AFV mode is active, this command also switches audio. If audio is in breakaway mode, the device display mode changes to show the audio connection status.

Switch audio only	AUD IN>OUT, IN>OUT, … Short form: A IN>OUT, IN>OUT, …	AUD IN>OUT, IN>OUT, …RESULT

Note:
When AFV mode is active, this command also switches video.

Read video connection	VID? OUT Short form: V? OUT VID? *	VID IN>OUT VID IN>1, IN>2, …
Read audio connection	AUD? OUT Short form: A? OUT AUD? *	AUD IN>OUT AUD IN>1, IN>2, …
Reset video and audio connections	AV-RST	AV-RST RESULT

Parameter Description:

IN = Input number or '0' to disconnect output.

'>' = Connection character between in and out parameters.

OUT = Output number or '*' for all outputs.

Examples:

Switch video and audio input 3 to output 7	#AV 3>7CR	~AV 3>7 OKCRLF
Switch video input 2 to output 4	#V 2>4CR	~VID 2>4 OKCRLF
Switch video input 4 to output 2 in machine number 6	#6@VID 4>2CR	~6@VID 4>2 OKCRLF
Disconnect video and audio output 4	#AV 0>4CR	~AV 0>4 OKCRLF
Switch video input 3 to all outputs	#V 3>* CR	~VID 3>* OKCRLF
Chaining multiple commands	#AV 1>* | V 3>4, 2>2, 2>1, 0>2 | V 3>9 | A 0>1 | V? * CR 1. Switch audio and video from input 1 to all outputs. 2. Switch video input 3 to output 4, video input 2 to output 2, video input 2 to output 1 and disconnect video output 2. 3. Switch video input 3 to output 9 (non-existent). 4. Disconnect audio output 1. 5. Get status of all video links. Command processing begins after entering CR . A response is sent for each command after processing.	~AV 1>* OKCRLF ~VID 3>4, 2>2, 2>1, 0>2 OKCRLF ~VID ERR003 CRLF ~AUD 0>1 OKCRLF ~VID 2>1, 0>2, 1>3, 3>4 CRLF

2.5 Preset Commands

Command	Syntax	Response
Store current connections to preset	PRST-STO PRESET Short form: PSTO PRESET	PRST-STO PRESET RESULT
Recall saved preset	PRST-RCL PRESET Short form: PRCL PRESET	PRST-RCL PRESET RESULT
Delete saved preset	PRST-DEL PRESET Short form: PDEL PRESET	PRST-DEL PRESET RESULT
Read video connections from saved preset	PRST-VID? PRESET,OUT Short form: PVID? PRESET,OUT PRST-VID? PRESET, *	PRST-VID PRESET, IN>OUT PRST-VID PRESET, IN>1, IN>2,…
Read audio connections from saved preset	PRST-AUD? PRESET,OUT Short form: PAUD? PRESET,OUT PRST-AUD? PRESET, *	PRST-AUD PRESET: IN>OUT PRST-AUD PRESET: IN>1, IN>2,…
Read saved presets list	PRST-LST? Short form: PLST?	PRST-LST PRESET, PRESET, …

Parameter Description:

PRESET = Preset number.

OUT = Output in preset to display, '*' for all.

Examples:

Store current audio and video connections to preset 5	#PRST-STR 5CR	~PRST-STR 5 OKCRLF
Recall audio and video connections from preset 3	#PRCL 3CR	~PRST-RCL 3 OKCRLF
Show source of video output 2 from preset 3	#PRST-VID? 3,2CR	~PRST-VID 3: 4>2 CRLF

2.6 Operation Commands

Command	Syntax	Response
Lock front panel	LOCK-FP LOCK-MODE Short form: LCK LOCK-MODE	LOCK-FP LOCK-MODE RESULT
Get front panel locking state	LOCK-FP?	LOCK-FP LOCK-MODE

Parameter Description:

LOCK-MODE = Front panel locking state:

'0' or 'off' to unlock front panel buttons

'1' or 'on' to lock front panel buttons

Reset device	RESET	RESET OK
Switch to protocol 2000*	P2000	P2000 OK

* Protocol 2000 has a command to switch back to ASCII protocol (like Protocol 3000)

2.7 Audio Parameters Commands

Command	Syntax	Response
Set simple audio volume	VOLUME VOLUME Short form: VOL VOLUME	VOLUME VOLUME RESULT
Increase/decrease simple audio volume	VOLUME +/- Short form: VOL +/-	VOLUME +/- RESULT
Read simple audio level	VOLUME? Short form: VOL?	VOLUME VOLUME
Set audio level in specific amplifier stage.	AUD-LVL STAGE, CHANNEL, VOLUME Short form: ADL STAGE, CHANNEL, VOLUME	AUD-LVL STAGE, CHANNEL, VOLUME RESULT
Read audio volume level	AUD-LVL? STAGE, CHANNEL Short form: ADL? STAGE	AUD-LVL STAGE, CHANNEL, VOLUME
Advanced commands for controlling each stage of audio amplification:		
Set audio bass level	BASS CHANNEL, BASS Short form: ADB CHANNEL, BASS	BASS CHANNEL, BASS RESULT
Read audio bass level	BASS? CHANNEL Short form: ADB? CHANNEL	BASS CHANNEL, BASS
Set audio treble level	TREBLE CHANNEL,TREBLE Short form: ADT CHANNEL,TREBLE	TREBLE CHANNEL, TREBLE RESULT
Read audio treble	TREBLE? CHANNEL Short form: ADT? CHANNEL	TREBLE CHANNEL, TREBLE
Set audio midrange	MIDRANGE CHANNEL, MID_RANGE Short form: ADM CHANNEL, MID_RANGE	MIDRANGE CHANNEL, MID_RANGE RESULT
Read audio midrange	MIDRANGE? CHANNEL Short form: ADM? CHANNEL	MIDRANGE CHANNEL, MID_RANGE
Set audio loudness	LOUDNESS CHANNEL, LOUDNESS Short form: ADS CHANNEL, LOUDNESS	LOUDNESS CHANNEL, LOUDNESS RESULT
Read audio loudness	LOUDNESS? CHANNEL Short form: ADS? CHANNEL	LOUDNESS CHANNEL, LOUDNESS
Set audio mix	MIX MIX-MODE	MIX MIX-MODE RESULT
Read audio mix	MIX?	MIX MIX-MODE
Mute audio	MUTE MUTE-MODE	MUTE MUTE-MODE RESULT
Read audio mute state	MUTE?	MUTE MUTE-MODE
Set stereo mode	STEREO STEREO-MODE	STEREO STEREO-MODE RESULT
Read stereo mode	STEREO?	STEREO STEREO-MODE
Set balance mode	BALANCE OUT-CHANNEL, BALANCE-LEVEL	BALANCE OUT-CHANNEL, BALANCE-LEVEL RESULT
Read balance mode	BALANCE? OUT-CHANNEL	BALANCE OUT-CHANNEL, BALANCE-LEVEL

Parameter Description:
STAGE = 'IN, 'OUT'
or
Numeric value of present audio processing stage. For example: '0' for input level, '1' for pre-amplifier, '2' for amplifier (OUT) etc.
CHANNEL = Input or Output #
VOLUME / BASS / TREBLE / MID_RANGE = Audio parameter in Kramer units, minus sign precedes negative values.
++ increase current value,
-- decrease current value.
MIX =
'0' or 'OFF'
'1' or 'ON'

2.8 Identification Commands

Command	Syntax	Response
Protocol handshaking	#CR	~OK CRLF
Read device model	MODEL?	MODEL MACHINE_MODEL
Read device serial number	SN?	SN SERIAL_NUMBER
Read device firmware version	VERSION?	VERSION MAJOR .MINOR .BUILD .REVISION
Set machine name	NAME MACHINE_NAME	NAME MACHINE_NAME RESULT
Read machine name	NAME?	NAME MACHINE_NAME
Reset machine name to factory default*	NAME-RST	NAME-RST MACHINE_FACTORY_NAME RESULT

***Note**: 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).
MACHINE_NAME = Up to 14 alphameric chars.
* **Machine factory name =** Model name + last 4 digits from serial number.

Set machine ID number	MACH-NUM MACHINE_NUMBER	MACH-NUM OLD_MACHINE_NUMBER ,NEW_MACHINE_NUMBER RESULT

* A response is sent after the machine number was changed. The response with the header is:
NEW_MACHINE_NUMBER @MACH-NUM OLD_MACHINE_NUMBER ,NEW_MACHINE_NUMBER OK

2.9 Network Setting Commands

Command	Syntax	Response
Set IP address	NET-IP IP_ADDRESS Short form: NTIP	NET-IP IP_ADDRESS RESULT
Read IP address	NET-IP? Short form: NTIP?	NET-IP IP_ADDRESS
Read MAC address	NET-MAC? Short form: NTMC	NET-MAC MAC_ADDRESS
Set subnet mask	NET-MASK SUBNET_MASK Short form: NTMSK	NET-MASK SUBNET_MASK RESULT
Read subnet mask	NET-MASK? Short form: NTMSK?	NET-MASK SUBNET_MASK
Set gateway address	NET-GATE GATEWAY_ADDRESS Short form: NTGT	NET-GATE GATEWAY_ADDRESS RESULT
Read subnet mask	NET-GATE? Short form: NTGT?	NET-GATE GATEWAY_ADDRESS
Set DHCP mode	NET-DHCP DHCP_MODE Short form: NTDH	NET-DHCP DHCP_MODE RESULT
Read subnet mask	NET-DHCP? Short form: NTDH?	NET-DHCP DHCP_MODE

DHCP_MODE =
'0' – Don't use DHCP (Use IP set by factory or IP set command).
'1' – Try to use DHCP, if unavailable use IP as above.

Change protocol Ethernet port	ETH-PORT PROTOCOL , PORT Short form: ETHP	ETH-PORT PROTOCOL , PORT RESULT
Read protocol Ethernet port	ETH-PORT? PROTOCOL Short form: ETHP?	ETH-PORT PROTOCOL , PORT

PROTOCOL = TCP/UDP (transport layer protocol)
PORT = Ethernet port that accepts Protocol 3000 commands
1-65535 = User defined port
0 - Reset port to factory default (50000 for UDP, 5000 for TCP)

2.10 Machine Information Commands

Command	Syntax	Response
Set device time and date	TIME DATE_TIME	TIME DATE_TIME RESULT
Read device time and date	TIME?	TIME? DATE_TIME

Note: Time setting commands require administrator authorization.

Read in/out count	INFO-IO?	INFO-IO: IN INPUTS_COUNT, OUT OUTPUTS_COUNT
Read max preset count	INFO-PRST?	INFO-PRST: VID PRESET_VIDEO_COUNT, AUD PRESET_AUDIO_COUNT
Execute firmware upgrade*	UPGRADE	UPGRADE OK

Firmware usually uploads to a device via a command like LDFW. The device may need to be reset to complete the process.

Command	Syntax	Response
Reset to factory default configuration	FACTORY	FACTORY RESULT

2.11 Advanced Switching Commands

Command	Syntax	Response
Set audio follow video mode	AFV AFV-MODE	AFV AFV-MODE RESULT
Note: This command affects the device front-panel mode and AUD/VID command.		
Read audio follow video mode	AFV?	AFV AFV-MODE

AFV-MODE = Front panel AFV mode
'0' or 'afv' sets front panel switching buttons to audio-follow-video state.
'1' or 'brk' sets front panel switching buttons to their previous audio state.