KRAMER ELECTRONICS LTD.

REFERENCE GUIDE

Protocol 3000

Version 2.10

Contents

Revision History

Rev	Author	Date	Changes
1.01	M Tal	27/11/11	Rewrite sections 2.1-2.2
1.02	M Tal	1/12/11	Rewrite sections 2.3-2.5
1.03	E Litvak	1/12/11	Rewrite sections 2.6-2.7 Added section 4.2
1.04	M Tal	4/12/11	Rewrite section 2.8 Some fixes
1.05	E Litvak	21/12/11	Edited commands #LDEDID, #LDFW, #GEDID Added commands #CPEDID, #GEDID-EXT Added Section 4 Added section 1.5
1.06	E Litvak	27/12/11	Added commands #SIGNAL, #SIGNAL? #DISPLAY, #DISPLAY? Edited section 3.1
1.07	F Strauss	18/1/12	Reformat and correct
1.08	F Strauss	5/2/12	Added commands: BAUD, BAUD?, GEDID-INF, GEDID-EXT-INF, IREN, IREN?, FPGA-VER?, LDFPGA, TMSRV, TMSRV?, NTDNS, NTDNS?, layer, TMLOC?, RGB? Result and error codes Device specific commands: MV-6, VP-81SID, PIP-4 Appendix entry: CRC calculation
1.09	C Hoyzer	22/10/13	Added new commands from the following documents: FC-2xETH P3K Commands to Add Protocol 3000 Matrix 1.8 Protocol 3001 - Multiviewers and more 1.10 TP577-X1 new commands VS-62D additional commands VS-88HFS protocol
2.2	R Bernstein	22/10/13	Moved new commands to Section 2 Sorted commands and tables alphabetically Removed index Added parameter table Section 6 Added cross references to parameter table
2.3	R Bernstein	27/10/13	Added signal validation table Removed CMD short columns Attended to factory and debug commands
2.4	R Bernstein	28/10/13	Repaired cross-references
2.5	F Strauss	17/02/14	Added index, reformatted

Rev	Author	Date	Changes
2.6	N Aharon	28/04/14	Commands removed: TMSRV, TMSRV?, TMLOC, TMLOC? Commands added: TIME-SRV, TIME-SRV?, TIME-LOC, TIME-LOC? Commands edited: AV-SW-TIMEOUT
2.7	F Strauss	12/05/14	Extensive formatting Commands added: VID-PATTERN, VID-PATTERN?, TUNNEL-CTRL, KLINK-INF, KLINK-CLS, MTX-MODE, MTX-MODE?
2.8	F Strauss	20/05/14	Factory commands separated, added missing commands
2.9	F Strauss	28/05/14	New commands added: DPSW-STATUS?, EQ-LVL, MIC-GAIN, MIX-LVL, IMAGE-PROP, SCLR-AS, SCLR-AUDIO-DELAY, SCLR-PCAUTO, SHOW-OSD
2.10	F Strauss	11/8/14	Command removed: NTDNS New commands added: LOCK-EDID, VFRZ, VIEW-MOD

1 Syntax

With Kramer Protocol 3000 you can control a device from any standard terminal software (for example, the Windows® HyperTerminal Application). This RS-232/RS-485 communications protocol uses a data rate of 115,200 baud, no parity, 8 data bits, and 1 stop bit.

1.1 Host Message Format

Start	Address (opt)	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 (opt)	Body	Delimiter
~	Sender_id@	Message	CR LF

1.2.1 Device Long Response

Echoing command:

Start	Address (opt)	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. Multiple commands are separated by a pipe ('|') character.

Message starting character

'#' - For host command/query

'~' - For machine response or machine command performed by keystroke operation on the front panel or IR remote controller.

Device address (Optional when directly connected to the device)

K-Net Device ID or MACHINE NUMBER followed by '@'

(ex. #02@CR LF)

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)

CR LF - For machine messages; carriage return (ASCII 13) + line-feed (ASCII 10)

Command chain separator character
When a message string contains more than 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 communication 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 the command parser).

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

1.5 Bidirectional Definition

All commands are bidirectional. That is, if the device receives the code, it performs the instruction. If the instruction is performed (due to a keystroke operation on the front panel or IR controller) these codes are sent to the PC or other RS-232 / Ethernet / USB controller.

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** once only, 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

This section lists and describes all the commands of Protocol 3000.

- System Commands - Mandatory (see Section 2.1)
- System Commands (see Section 2.2)
- File System Commands (see Section 2.3)
- Authentication Commands (see Section 2.4)
- Switching/Routing Commands (see Section 2.5)
- Video Commands (see Section 0)
- Audio Commands (see Section 2.7)
- Communication Commands (see Section 2.8)
- Multiviewer/Scaler Commands (see Section 2.9)

2.1 System Commands - Mandatory

All devices running Protocol 3000 use these commands.

Command	Description	Type	Permission
#	Protocol handshaking	System-mandatory	End User
BUILD-DATE?	Get device build date	System-mandatory	End User
FACTORY	Reset to factory default configuration	System-mandatory	End User
HELP	Get command list	System-mandatory	End User
MODEL?	Get device model	System-mandatory	End User
PROT-VER?	Get device protocol version	System-mandatory	End User
RESET	Reset device	System-mandatory	Administrator
SN?	Get device serial number	System-mandatory	End User
VERSION?	Get device firmware version	System-mandatory	End User

Command - #		Command Type - System-mandatory	
Command Name		**Permission**	**Transparency**
Set:	#	End User	Public
Get:	-	-	-
Description		**Syntax**	
Set:	Protocol handshaking	#CR	
Get:	-	-	
Response			
~nn@SP**OK**CR LF			
Parameters			
Response Triggers			
Notes			
Use to validate the Protocol 3000 connection and get the machine number			

Command - **BUILD-DATE**		Command Type - System-mandatory	
Command Name		**Permission**	**Transparency**
Set:	**-**	-	-
Get:	**BUILD-DATE?**	End User	Public
Description		**Syntax**	
Set:	Get device build date	#**BUILD-DATE**[CR]	
Get:	-	-	
Response			
~[nn]@**BUILD-DATE**[SP]*date*[SP]*time*[CR LF]			
Parameters			
date - Format: YYYY/MM/DD where YYYY = Year, MM = Month, DD = Day *time* - Format: hh:mm:ss where hh = hours, mm = minutes, ss = seconds			
Response Triggers			
Notes			

Command - **FACTORY**		Command Type - System-mandatory	
Command Name		**Permission**	**Transparency**
Set:	**FACTORY**	End User	Public
Get:	**-**	-	-
Description		**Syntax**	
Set:	Reset device to factory default configuration	#**FACTORY**[CR]	
Get:	-	-	
Response			
~[nn]@**FACTORY**[SP]**OK**[CR LF]			
Parameters			
Response Triggers			
Notes			
This command deletes all user data from the device. The deletion can take some time.			

Command - **HELP**		Command Type - System-mandatory	
Command Name		**Permission**	**Transparency**
Set:	**-**	-	-
Get:	**HELP**	End User	Public
Description		**Syntax**	
Set:	-	-	
Get:	Get command list or help for specific command	2 options: 1. #**HELP**[CR] 2. #**HELP**[SP]*command_name*[CR]	
Response			
1. Multi-line: ~nn@**Device available protocol 3000 commands:**[CR LF]*command*,[SP]*command*…[CR LF] **To get help for command use: HELP (COMMAND_NAME)**[CR LF] 2. Multi-line: ~nn@**HELP**[SP]*command*:[CR LF]*description*[CR LF]**USAGE:***usage*[CR LF]			
Parameters			
Response Triggers			
Notes			

Command - **MODEL?**		Command Type - System-mandatory	
Command Name		**Permission**	**Transparency**
Set:	**-**	-	-
Get:	**MODEL?**	End User	Public
Description		**Syntax**	
Set:	-	-	
Get:	Get device model	#**MODEL?**[CR]	
Response			
~nn@**MODEL**[SP]*model_name*[CR LF]			
Parameters			
model_name - String of up to 19 printable ASCII chars			
Response Triggers			
Notes			

Command - **PROT-VER?**		Command Type - System-mandatory	
Command Name		**Permission**	**Transparency**
Set:	**-**	-	-
Get:	**PROT-VER?**	End User	Public
Description		**Syntax**	
Set:	-	-	
Get:	Get device protocol version	#**PROT-VER?**CR	
Response			
~nn@**PROT-VER**SP3000:*version*CR LF			
Parameters			
Version - XX.XX where X is a decimal digit			
Response Triggers			
Notes			

Command - **RESET**		Command Type - System-mandatory	
Command Name		**Permission**	**Transparency**
Set:	**RESET**	Administrator	Public
Get:	**-**	-	-
Description		**Syntax**	
Set:	Reset device	#**RESET**CR	
Get:	-	-	
Response			
~nn@**RESET**SP**OK**CR LF			
Parameters			
Response Triggers			
Notes			
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 - **SN?**		Command Type - System-mandatory	
Command Name		**Permission**	**Transparency**
Set:	**-**	-	-
Get:	**SN?**	End User	Public
Description		**Syntax**	
Set:	-	-	
Get:	Get device serial number	#**SN?**CR	
Response			
~nn@**SN**SP*serial_number*CR LF			
Parameters			
serial_number - 11 decimal digits, factory assigned			
Response Triggers			
Notes			
For new products with 14 digit serial numbers, use only the last 11 digits			

Command - **VERSION?**		Command Type - System-mandatory	
Command Name		**Permission**	**Transparency**
Set:	**-**	-	-
Get:	**VERSION?**	End User	Public
Description		**Syntax**	
Set:	-	-	
Get:	Get firmware version number	#**VERSION?**CR	
Response			
~nn@**VERSION**SP*firmware_version*CR LF			
Parameters			
firmware_version - XX.XX.XXXX where the digit groups are: major.minor.build version			
Response Triggers			
Notes			

2.2 System Commands

Command	Description	Type	Permission
AV-SW-MODE	Set/get auto switch mode	System	End user
AV-SW-TIMEOUT	Set/get auto switching timeout	System	End user
BAUD	Set/get protocol serial port baud rate	System	End User
CPEDID	Copy EDID data from the output to the input EEPROM	System	End User
DISPLAY?	Get output HPD status	Switch	End User
DPSW-STATUS?	Get the DIP-switch status	System	End User
FPGA-VER?	Get current FPGA version	System	End User
GEDID	Set/get EDID data	System	End User Internal SW
HDCP-MOD	Set/get HDCP mode	System	Administrator
HDCP-STAT?	Get HDCP signal status	System	End user
IDV	Set visual indication from device	System	End User
INFO-IO?	Get in/out count	System	End User
INFO-PRST?	Get maximum preset count	System	End User
IREN	Set/get IR interface state	System	End User
LDEDID	Load EDID data	System	End User Internal SW
LDFPGA	Load new FPGA file	System - Packets	Administrator
LDFW	Load new firmware file	System	End User Internal SW
LOCK-EDID	Lock last read EDID	System	End User
LOCK-FP	Set/get front panel lock	System	Administrator
MACH-NUM	Set machine number	System	Administrator
NAME	Set/get machine (DNS) name	System	Administrator
NAME-RST	Reset machine name to factory default (DNS)	System	Administrator
P2000	Switch to Protocol 2000	System	End User
POWER-SAVE	Set/get power save mode	System	Administrator
PRIO	Set/get input priority	System	Administrator
PRIORITY	Set/get priority for all channels	System	Administrator
PROG-ACTION	Set/get step-in button action list	System	End user
PRST-AUD?	Get audio connections from saved preset	System	End User
PRST-LST?	Get saved preset list	System	End User
PRST-RCL	Recall saved preset list	System	End User
PRST-STO	Store current connections to preset	System	End User
PRST-VID?	Get video connections from saved preset	System	End User
SIGNAL?	Get input signal lock status	Switch	End User
TIME	Set/get device time and date	System	Administrator
TIME-LOC	Set/get local time offset from UTC/GMT	System	End User

Command - **AV-SW-MODE**		Command Type - System	
Command Name		**Permission**	**Transparency**
Set:	**AV-SW-MODE**	End user	Public
Get:	**AV-SW-MODE?**	End user	Public
Description		**Syntax**	
Set:	Set input auto switch mode (per output)	# **AV-SW-MODE**SP*layer,output_id, mode*CR	
Get:	Get input auto switch mode (per output)	# **AV-SW-MODE?**SP*layer,output_id*CR	

Response

~ nn@**AV-SW-MODE**SP*layer,output_id, mode*CR LF

Parameters

layer – see Section 5.12 Layer Enumeration
output_id - 1….num of system outputs
mode - 0 - manual
1 - priority switch
2 - last connected switch

Response Triggers

Notes

Command - **AV-SW-TIMEOUT**		Command Type - System	
Command Name		**Permission**	**Transparency**
Set:	**AV-SW-TIMEOUT**	End User	Public
Get:	**AV-SW-TIMEOUT?**	End User	Public
Description		**Syntax**	
Set:	Set auto switching timeout	#**AV-SW-TIMEOUT**SP*action,time_out*CR	
Get:	Get auto switching timeout	#**AV-SW-TIMEOUT?**SP*action*CR	

Response

~ nn@**AV-SW-TIMEOUT**SP*action,time_out*CR

Parameters

action - 0 - on video signal loss timeout
1 - on new video signal detected switch timeout
2 - on audio signal loss timeout
3 - on audio signal detected switch timeout
4 - on no input signals, disable 5V on video output timeout
timeout - timeout in seconds

Response Triggers

Notes

Command - **BAUD**		Command Type - System	
Command Name		**Permission**	**Transparency**
Set:	**BAUD**	Administrator	Public
Get:	**BAUD?**	Administrator	Public
Description		**Syntax**	
Set:	Set protocol serial port baud rate	#**BAUD**SP*baud_rate*CR	
Get:	Get protocol serial port baud rate (Option 1 - for current baud rate, Option 2 - for list of supported baud rates)	Option 1: #**BAUD?**CR Option 2: #**BAUD?**SP*baud_param*CR	
Response			
~nn@**BAUD**SP*baud_rate*CR LF Option 1: ~nn@**BAUD**SP*current_baud_rate*CR LF Option 2: ~nn@**BAUD**SP*baud_rate1, baud_rate2,...*CR LF			
Parameters			
baud_rate - 9600 / 115200 / else - new baud rate to set *current_baud_rate* - 9600 / 115200 / else - current protocol serial port baud rate *baud_param* - 0 - get the list of supported baud rates *baud_rate1, baud_rate2,* … - list of supported baud rates			
Response Triggers			
Notes			
The new defined baud rate is stored in the EEPROM and used when powering up Default baud rate is 115200 (on factory reset) Only works with devices supporting this command (if *ERR 002* is returned, the default baud rate is used)			

Command - **CPEDID**		Command Type - System	
Command Name		**Permission**	**Transparency**
Set:	**CPEDID**	End User	Public
Get:	-	-	-
Description		**Syntax**	
Set:	Copy EDID data from the output to the input EEPROM	#**CPEDID**SP*src_type, src_id, dst_type, dest_bitmap*CR	
Get:	-	-	
Response			
~nn@**CPEDID**SP*src_stg, src_id, dst_type, dest_bitmap*CR LF			
Parameters			
src_type - *EDID* source type (usually output) (see Section 5.14 EDID Source) *src_id* - number of chosen source stage (1.. max number of inputs/outputs) *dst_type* - *EDID destination* type (usually input) (see Section 5.14 EDID Source) *dest_bitmap* - bitmap representing destination IDs. Format: XXXX…X, where X is hex digit. The binary form of every hex digit represents corresponding destinations. Setting '1' says that EDID data has to be copied to this destination			
Response Triggers			
Response is sent to the com port from which the Set was received (before execution)			
Notes			
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			

Command - **DISPLAY?**		Command Type - System	
Command Name		**Permission**	**Transparency**
Set:	-	-	-
Get	**DISPLAY?**	End User	Public
Description		**Syntax**	
Set:	-	-	
Get:	Get output HPD status	#**DISPLAY?**SP*out_id*CR	
Response			
~ nn@**DISPLAY**SP*out_id,status* CR LF			
Parameters			
out_id - output number *status* - HPD status according to signal validation (see Section 5.15 Signal Validation)			
Response Triggers			
After execution, response is sent to the com port from which the Get was received Response is sent after every change in output HPD status ON to OFF Response is sent after every change in output HPD status OFF to ON and ALL parameters (new EDID, etc.) are stable and valid			
Notes			

Command – **DPSW-STATUS?**		Command Type – System	
Command Name		**Permission**	**Transparency**
Set:	**-**	-	-
Get:	**DPSW-STATUS?**	End User	Public
Description		**Syntax**	
Set:	-	-	
Get :	Get the DIP-switch status	# **DPSW-STATUS?** SP *dp_sw_id* CR	
Response			
~nn@ **DPSW-STATUS?** SP *dp_sw_id, status* CR LF			
Parameters			
dp_sw_id - 1….num of DIP switches *status* - 0: up 1: down			
Response Triggers			
Notes			

Command - **FPGA-VER?**		Command Type - System	
Command Name		**Permission**	**Transparency**
Set:	**-**	-	-
Get:	**FPGA-VER?**	End User	Public
Description		**Syntax**	
Set:	-	-	
Get:	Get current FPGA version	#**FPGA-VER?** SP *id* CR	
Response			
~nn@**FPGA-VER** SP *id, expected_ver, actual_ver* CR LF			
Parameters			
id - FPGA id *expected_ver* - expected FPGA version for current firmware *actual_ver* - actual FPGA version			
Response Triggers			
Notes			

Command - **GEDID**		Command Type - System	
Command Name		**Permission**	**Transparency**
Set:	**GEDID**	Administrator	Public
Get:	**GEDID?**	End User	Public
Description		**Syntax**	
Set:	Set EDID data from device	#**GEDID**SP*stage, stage_id* CR	
Get:	Get EDID support on certain input/output	#**GEDID?**SP*stage, stage_id* CR	

Response

Set:
Multi-line response:

~nn@**GEDID**SP*stage,stage_id,size*CR LF

EDID_data CR LF

~nn@**GEDID**SP*stage,stage_id*SP**OK**CR LF

Get:

~nn@**GEDID**SP*stage,stage_id,size*CR LF

Parameters

stage - input/output (see Section 5.14 EDID Source)
stage_id - number of chosen stage (1.. max number of inputs/outputs)
size - EDID data size. For Set, size of data to be sent from device, for Get, 0 means no EDID support

Response Triggers

Response is sent to the com port from which the Set (before execution) / Get command was received

Notes

For Get, size=0 means EDID is not supported

For old devices that do not support this command, ~nn@ ERR 002 CR LF is received

Command - **HDCP-MOD**		Command Type - System	
Command Name		**Permission**	**Transparency**
Set:	**HDCP-MOD**	Administrator	Public
Get:	**HDCP-MOD?**	End User	Public
Description		**Syntax**	
Set:	Set HDCP mode	#**HDCP-MOD**SP*inp_id,mode*CR	
Get:	Get HDCP mode	#**HDCP-MOD?**SP*stage_id*CR	
Response			
Set / Get: ~ nn@**HDCP-MOD**SP*stage_id,mode*CR LF			
Parameters			
inp_id - input number (1.. max number of inputs) *mode* - HDCP mode (see Section 5.17 - HDCP Types)			
Response Triggers			
Response is sent to the com port from which the Set (before execution) / Get command was received Response is sent to all com ports after execution if HDCP-MOD was set by any other external control device (button press, device menu and similar) or HDCP mode changed			
Notes			
Set HDCP working mode on the device input: HDCP supported - HDCP_ON [default] HDCP not supported - HDCP OFF HDCP support changes following detected sink - MIRROR OUTPUT			

Command - **HDCP-STAT**		Command Type - System	
Command Name		**Permission**	**Transparency**
Set:	-	-	-
Get:	**HDCP-STAT?**	End User	Public
Description		**Syntax**	
Set:	None	-	
Get:	Get HDCP signal status	#**HDCP-STAT?**SP*stage,stage_id*CR	
Response			
Set / Get: ~ nn@**HDCP-STAT**SP*stage,stage_id,mode*CR LF			
Parameters			
stage – input/output (see Section 5.2 Stage) *stage_id* - number of chosen stage (1.. max number of inputs/outputs) *actual_status* - signal encryption status - valid values ON/OFF (see Section 5.15 HDCP Types)			
Response Triggers			
Response is sent to the com port from which the Set (before execution) / Get command was received Response is sent to all com ports after execution if HDCP-STAT was set by any other external control device (button press, device menu and similar) or HDCP mode changed			
Notes			

Command - IDV		Command Type - System	
Command Name		**Permission**	**Transparency**
Set:	**IDV**	End User	Public
Get:	**-**	-	-
Description		**Syntax**	
Set:	Set visual indication from device	#**IDV**[CR]	
Get:	-	-	
Response			
~[nn]@**IDV**[SP]**OK**[CR LF]			
Parameters			
Response Triggers			
Notes			
Using this command, some devices can light a sequence of buttons or LEDs to allow identification of a specific device from similar devices			

Command - INFO-IO?		Command Type - System	
Command Name		**Permission**	**Transparency**
Set:	**-**	-	-
Get:	**INFO-IO?**	End User	Public
Description		**Syntax**	
Set:	-	-	
Get:	Get in/out count	#**INFO-IO?**[CR]	
Response			
~[nn]@**INFO-IO?**[SP]IN[SP] *inputs_count*, OUT[SP]*outputs_count*[CR LF]			
Parameters			
inputs_count - number of inputs in the unit *outputs_count* - number of outputs in the unit			
Response Triggers			
Notes			

Command - **INFO-PRST?**		Command Type - System	
Command Name		**Permission**	**Transparency**
Set:	**-**	-	-
Get:	**INFO-PRST?**	End User	Public
Description		**Syntax**	
Set:	-	-	
Get:	Get maximum preset count	#**INFO-PRST?**CR	
Response			
~nn@**INFO-PRST?**SP VIDSP*preset_video_count*, AUDSP*preset_audio_count*CR LF			
Parameters			
preset_video_count - maximum number of video presets in the unit *preset_audio_count* - maximum number of audio presets in the unit			
Response Triggers			
Notes			
In most units, video and audio presets with the same number are stored and recalled together by commands #PRST-STO and #PRST-RCL			

Command - **IREN**		Command Type - System	
Command Name		**Permission**	**Transparency**
Set:	**IREN**	End User	Public
Get:	**IREN?**	End User	Public
Description		**Syntax**	
Set:	Set IR interface state	#**IREN**SP*enable*CR	
Get:	Get IR interface state	#**IREN?**CR	
Response			
~nn@**IREN**SP*enable*CR LF			
Parameters			
enable - 0 - disable IR interface 1 - enable IR interface			
Response Triggers			
Notes			

Command - **LDEDID**		Command Type - System	
Command Name		**Permission**	**Transparency**
Set:	**LDEDID**	End User	Public
Get:	-	-	-
Description		**Syntax**	
Set:	Write EDID data from external application to device	Multi-step syntax (see following steps)	
Get:	None	None	

Communication Steps (Command and Response)

Step 1: #**LDEDID** SP *dst_type, dest_bitmask, size, safe_mode* CR

Response 1: ~nn@**LDEDID** SP *dst_type, dest_bitmask, size, safe_mode* SP **READY** CR LF or

~nn@**LDEDID** SP **ERRnn** CR LF

Step 2: If **ready** was received, send EDID_DATA

Response 2: ~nn@**LDEDID** SP *dst_type, dest_bitmask, size, safe_mode* SP **OK** CR LF or

~nn@**LDEDID** SP **ERRnn** CR LF

Parameters

dst_type - EDID destination type (usually input) (see Section 5.14 EDID Source)
dest_bitmask - bitmap representing destination IDs. Format: 0x********, where * is ASCII presentation of hex digit. The binary presentation of this number is a bit mask for destinations. Setting '1' means EDID data has to be copied to this destination
size - EDID data size
safe_mode - 0 - Device accepts the EDID as is without trying to adjust
1 - Device tries to adjust the EDID
EDID_DATA - data in protocol packets (see Section 4)

Response Triggers

Response is sent to the com port from which the **Set** (before execution)

Notes

When the unit receives the **LDEDID** command it replies with **READY** and enters the special EDID packet wait mode. In this mode the unit can receive only packets and not regular protocol commands.
If the unit does not receive correct packets for 30 seconds or is interrupted for more than 30 seconds before receiving all packets, it sends timeout error ~nn@**LDEDID** SP **ERR01** CR LF and returns to the regular protocol mode. If the unit received data that is not a correct packet, it sends the corresponding error and returns to the regular protocol mode.

See Protocol Packet reference in Section 4

Command - **LDFPGA**		Command Type - System - Packets	
Command Name		**Permission**	**Transparency**
Set:	**LDFPGA**	Internal SW	Public
Get:	**-**	-	-
Description		**Syntax**	
Set:	Load new FPGA file	Step 1: #**LDFPGA**SP*size, CRC, fpga_id, force*CR Step 2: If ready was received, send FPGA_DATA	
Get:	-	-	
Response			
Response 1: ~nn@**LDFPGA**SP*size*SP**READY**CR LF or ~nn@**LDFW**SP**ERRnn**CR LF Response 2: ~nn@**LDFPGA**SP*size*SP**OK**CR LF			
Parameters			
size -size of firmware data that is sent *CRC* - FPGA file CRC (see appendix) *fpga_id* - FPGA ID (if there are more than one). Default - 1 *force* – 1, ignore CRC calculation FPGA_DATA - ***.rbf** file in protocol packets (see Section 4)			
Response Triggers			
Notes			
See Protocol Packet reference in Section 4. Use this command in dedicated SW application			

Command - **LDFW**		Command Type - System - Packets	
Command Name		**Permission**	**Transparency**
Set:	**LDFW**	Internal SW	Public
Get:	**-**	-	-
Description		**Syntax**	
Set:	Load new firmware file	Step 1: #**LDFW**SP*size*CR Step 2: If ready was received, send FIRMWARE_DATA	
Get:	-	-	
Response			
Response 1: ~nn@**LDFW**SP*size*SP**READY**CR LF or ~nn@**LDFW**SP**ERRnn**CR LF Response 2: ~nn@**LDFW**SP*size*SP**OK**CR LF			
Parameters			
size - size of firmware data that is sent FIRMWARE_DATA - HEX or KFW file in protocol packets (see Section 4)			
Response Triggers			
Notes			
In most devices firmware data is saved to flash memory, but the memory does not update until receiving the “UPGRADE” command and is restarted. See Protocol Packet reference in Section 4. Use this command in dedicated SW application			

Command – **LOCK-EDID**		Command Type – System	
Command Name		**Permission**	**Command Name**
Set:	**LOCK-EDID**	End User	End User
Get:	**LOCK-EDID?**	End User	End User
	Description	Syntax	
Set:	Lock EDID	#**LOCK-EDID**SP *input_id,lock_mode* CR	
Get :	Get EDID lock state	#**LOCK-EDID?**SP *input_id* CR	
		Response	
~nn@**LOCK-EDID**SP *input_id,lock_mode* CR LF			
Parameters			
input_id - 1….num of system inputs *lock_mode* - 0/OFF - unlocks EDID, 1/ON - locks EDID (see Section5.1 On/Off)			
Response triggers			
Notes			

Command - **LOCK-FP**		Command Type - System	
Command Name		**Permission**	**Transparency**
Set:	**LOCK-FP**	End User	Public
Get:	**LOCK-FP?**	End User	Public
Description		**Syntax**	
Set:	Lock front panel	Option 1: #**LOCK-FP**SP*lock_mode*CR Option 2: #**LOCK-FP**SP*device_id,lock_mode*CR	
Get:	Get front panel lock state	Option 1: #**LOCK-FP?**CR Option 2: #**LOCK-FP?**SP*device_id*CR	
Response			
Set: Option 1: ~nn@**LOCK-FP**SP*lock_mode*SP**OK**CR LF Option 2: ~01@**LOCK-FP**SP*device_id,lock_mode*SP**OK**CR LF Get: Option 1: ~nn@**LOCK-FP**SP*lock_mode*CR LF Option 2: ~01@**LOCK-FP**SP*device_id, lock_mode*CR LF			
Parameters			
lock_mode - 0/OFF - unlocks the front panel buttons, 1/ON - locks the front panel buttons *device_id* - for K-Net controllers, select the button panel to lock. Locking is allowed only from the master			
Response Triggers			
Notes			

Command - **MACH-NUM**		Command Type - System	
Command Name		**Permission**	**Transparency**
Set:	**MACH-NUM**	End User	Public
Get:	**-**	-	-
Description		**Syntax**	
Set:	Set machine number	#**MACH-NUM**SP*machine_number*CR	
Get:	-	-	
Response			
~nn@**MACH-NUM**SP*machine_number***OK**CR LF			
Parameters			
machine_number - new device machine number			
Response Triggers			
Notes			
Some devices do not set the new machine number until the device is restarted Some devices can change the machine number only from DIP-switches			

Command - **NAME**		Command Type - System (Ethernet)	
Command Name		**Permission**	**Transparency**
Set:	**NAME**	Administrator	Public
Get:	**NAME?**	End User	Public
Description		**Syntax**	
Set:	Set machine (DNS) name	#**NAME**SP*machine_name*CR	
Get:	Get machine (DNS) name	#**NAME?**CR	
Response			
Set: ~nn@**NAME**SP*machine_name*SP**OK**CR LF			
Get: ~nn@**NAME?**SP*machine_name*CR LF			
Parameters			
machine_name - String of up to 14 alpha-numeric chars (can include hyphen, not at the beginning or end)			
Response Triggers			
Notes			
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)			

Command - **NAME-RST**		Command Type - System (Ethernet)	
Command Name		**Permission**	**Transparency**
Set:	**NAME-RST**	Administrator	Public
Get:	**-**	-	-
Description		**Syntax**	
Set:	Reset machine (DNS) name to factory default	#**NAME-RST**CR	
Get:	-	-	
Response			
~nn@**NAME-RST**SP**OK**CR LF			
Parameters			
Response Triggers			
Notes			
Factory default of machine (DNS) name is “KRAMER_” + 4 last digits of device serial number			

Command - **P2000**		Command Type - System	
Command Name		**Permission**	**Transparency**
Set:	**P2000**	End User	Public
Get:	**-**	-	-
Description		**Syntax**	
Set:	Switch to protocol 2000	#**P2000**[CR]	
Get:	-	-	
Response			
~[nn]@**P2000**[SP]**OK**[CR LF]			
Parameters			
Response Triggers			
Notes			
Available only for devices that support Protocol 2000 Protocol 2000 has a command to switch back to an ASCII protocol like Protocol 3000			

Command - **POWER-SAVE**		Command Type - System	
Command Name		**Permission**	**Transparency**
Set:	**POWER-SAVE**	Administrator	Public
Get:	**POWER-SAVE?**	End User	Public
Description		**Syntax**	
Set:	Set power save mode	#**POWER-SAVE**[SP]*mode*[CR]	
Get:	Get power save mode	#**POWER-SAVE?**[CR]	
Response			
Set: ~[nn]@**POWER-SAVE**[SP]*mode*[SP]**OK**[CR LF] Get: ~[nn]@**POWER-SAVE**[SP]*mode*[CR LF]			
Parameters			
Set *mode* – 0/OFF - deactivates power saving mode, 1/ON - activates power saving mode Get *mode* - OFF when power saving mode is not active, ON when power saving mode is active			
Response Triggers			
Notes			

Command - **PRIO**		Command Type - System	
Command Name		**Permission**	**Transparency**
Set:	**PRIO**	Administrator	Public
Get	**PRIO?**	Administrator	Public
Description		**Syntax**	
Set:	Set input priority	#**PRIO**SP*input_id,prio*CR	
Get:	Get input priority	#**PRIO?**SP*input_id*CR	
Response			
~ nn@**PRIO**SP*input_id,prio*CR LF			
Parameters			
input_id - window number setting new source *prio* - assigned priority (1.. max priority)			
Response Triggers			
After execution, response is sent to the com port from which the Set/Get was received After execution, response is sent to all com ports if PRIO was set by any other external control device (button press, device menu and similar)			
Notes			
The PRIO max value may vary for different devices			

Command - **PRIORITY**		Command Type - System	
Command Name		**Permission**	**Transparency**
Set:	**PRIORITY**	Administrator	Public
Get:	**PRIORITY?**	Administrator	Public
Description		**Syntax**	
Set:	Set input priority	# **PRIORITY**SP*layer,PRIORITY1, PRIORITY2… PRIORITYn*CR	
Get:	Get input priority	# **PRIORITY?***layer*CR	
Response			
~ nn@ **PRIORITY**SP*layer,PRIORITY1, PRIORITY2… PRIORITYn*CR LF			
Parameters			
layer – see Section 5.12 Layer Enumeration *PRIORITY1* - priority of first input *PRIORITYn*- priority of input n			
Response Triggers			
Notes			
WP-577VH – layer parameter is not used			

Command - **PROG-ACTION**		Command Type - System	
Command Name		**Permission**	**Transparency**
Set:	**PROG-ACTION**	End user	Public
Get:	**PROG-ACTION?**	End user	Public
Description		**Syntax**	
Set:	Set step-in button action list	# **PROG-ACTION** SP *type, port_id, button_id, action_type* CR	
Get:	Get step-in button action list	# **PROG-ACTION?** SP *port_type, port_id, button_id* CR	
Response			
Get / Set:~ nn@ **PROG-ACTION** SP *port_type, port_id, button_id, action_type* CR LF			
Parameters			
port_type - input/output (see Section 5.2 Stage) *port_id* - port id *button_id* - external programmable button ID *action_type* - action to perform after receiving *button_id* (see Section 5.13 Software Programmed)			
Response Triggers			
Notes			
Programs matrix action as a response for external event (programmable button pressed)			

Command - **PRST-AUD?**		Command Type - System	
Command Name		**Permission**	**Transparency**
Set:	**-**	-	-
Get:	**PRST-AUD?**	End User	Public
Description		**Syntax**	
Set:	-	-	
Get:	Get audio connections from saved preset	#**PRST-AUD?** SP *preset, out* CR #**PRST-AUD?** SP *preset,** CR	
Response			
~nn@**PRST-AUD** SP *preset, in>out* CR LF ~nn@**PRST-AUD** SP *preset, in>1, in>2, in>3,…* CR LF			
Parameters			
preset - preset number *n* - input number or '0' if output is disconnected > - Connection character between in and out parameters *out* - Output number or '*' for all outputs			
Response Triggers			
Notes			
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-LST?**		Command Type - System	
Command Name		**Permission**	**Transparency**
Set:	**-**	-	-
Get:	**PRST-LST?**	End User	Public
Description		**Syntax**	
Set:	-	-	
Get:	Get saved preset list	#**PRST-LST?**CR	
Response			
~nn@**PRST-LST**SP *preset, preset, …* CR LF			
Parameters			
preset - preset number			
Response Triggers			
Notes			
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**		Command Type - System	
Command Name		**Permission**	**Transparency**
Set:	**PRST-RCL**	End User	Public
Get:	**-**	-	-
Description		**Syntax**	
Set:	Recall saved preset list	#**PRST-RCL**SP *preset* CR	
Get:	-	-	
Response			
~nn@**PRST-RCL**SP *preset* CR LF			
Parameters			
preset - preset number			
Response Triggers			
Notes			
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**		Command Type - System	
Command Name		**Permission**	**Transparency**
Set:	**PRST-STO**	End User	Public
Get:	**-**	-	-
Description		**Syntax**	
Set:	Store current connections, volumes and modes in preset	#**PRST-STO** SP *preset* CR	
Get:	-	-	
Response			
~nn@**PRST-STO** SP *preset* CR LF			
Parameters			
preset - preset number			
Response Triggers			
Notes			
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-VID?**		Command Type - System	
Command Name		**Permission**	**Transparency**
Set:	**-**	-	-
Get:	**PRST-VID?**	End User	Public
Description		**Syntax**	
Set:	-	-	
Get:	Get video connections from saved preset	#**PRST-VID?**SP*preset, out*CR #**PRST-VID?**SP*preset, **CR	
Response			
~nn@**PRST-VID**SP*preset, in>out* CR LF ~nn@**PRST-VID**SP*preset, in>1, in>2, in>3, …* CR LF			
Parameters			
preset - preset number *n* - input number or '0' if output disconnected > - connection character between in and out parameters *out* - output number or '*' for all outputs			
Response Triggers			
Notes			
In most units, video and audio presets with the same number are stored and recalled together by commands #PRST-STO and #PRST-RCL			
Examples			
Store current audio and video connections, volumes and modes to preset 5		#PRST-STO 5CR	~PRST-STO 5CR LF
Recall audio and video connections from preset 3		#PRCL 3CR	~PRST-RCL 3CR LF
Show source of video output 2 from preset 3		#PRST-VID? 3,2CR	~PRST-VID 3, 4>2CR LF

Command - **SIGNAL**		Command Type - System	
Command Name		**Permission**	**Transparency**
Set:	-	-	-
Get	**SIGNAL?**	End User	Public
Description		**Syntax**	
Set:	-	-	
Get:	Get input signal lock status	#**SIGNAL?**SP*inp_id*CR	
Response			
~ nn@**SIGNAL**SP *inp_id,status* CR LF			
Parameters			
inp_id - input number *status* - lock status according to signal validation (see Section 5.15 Signal Validation)			
Response Triggers			
After execution, a response is sent to the com port from which the Get was received Response is sent after every change in input signal status ON to OFF, or OFF to ON			
Notes			

Command - **TIME**		Command Type - System	
Command Name		**Permission**	**Transparency**
Set:	**TIME**	Administrator	Public
Get:	**TIME?**	End User	Public
Description		**Syntax**	
Set:	Set device time and date	#**TIME**SP*day_of_week,date,time*CR	
Get:	Get device time and date	#**TIME?**CR	
Response			
~nn@**TIME**SP*day_of_week, date, time*SP**OK**CR LF			
Parameters			
day_of_week - one of {SUN,MON,TUE,WED,THU,FRI,SAT} *date* - Format: DD-MM-YYYY. *time* - Format: hh:mm:ss			
Response Triggers			
Notes			
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			

Command - **TIME-LOC**		Command Type - System	
Command Name		**Permission**	**Transparency**
Set:	**TIME-LOC**	End User	Public
Get:	**TIME-LOC?**	End User	Public
Description		**Syntax**	
Set:	Set local time offset from UTC/GMT	#**TIME-LOC**SP*UTC_off,DayLight*CR	
Get:	Get local time offset from UTC/GMT	#**TIME-LOC?**CR	
Response			
~nn@ **TIME-LOC**SP*UTC_off,DayLight* CR LF			
Parameters			
UTC_off - Offset of device time from UTC/GMT (without daylight time correction) *DayLight* - 0 - no daylight saving time, 1 - daylight saving time			
Response Triggers			
Notes			
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			

2.3 File System Commands

Command	Description	Type	Permission
DEL	Delete file	File System	Administrator
DIR	List files in device	File System	Administrator
FORMAT	Format file system	File System	Administrator
FS-FREE?	Get file system free space	File System	Administrator
GET	Get file	File System	Administrator
LOAD	Load file to device	File System	End User Internal SW

Command - **DEL**		Command Type - File System	
Command Name		**Permission**	**Transparency**
Set:	**DEL**	Administrator	Public
Get:	**-**	-	-
Description		**Syntax**	
Set:	Delete file	#**DEL**[SP]*file_name*[CR]	
Get:			
Response			
~[nn]@**DEL**[SP]*file_name*[SP]**OK**[CR LF]			
Parameters			
file_name - name of file to delete (file names are case-sensitive)			
Response Triggers			
Notes			

Command - **DIR**		Command Type - File System	
Command Name		**Permission**	**Transparency**
Set:	**DIR**	Administrator	Public
Get:	**-**	-	-
Description		**Syntax**	
Set:	List files in device	#**DIR**CR	
Get:	-	-	
Response			
Multi Line: ~nn@**DIR**CR LF *file_name* TAB *file_size*SP bytes.,SP ID:SP*file_id*CR LF TAB*free_size*SP bytes.CR LF			
Parameters			
file_name - name of file *file_size* - file size in bytes. A file can take more space on device memory *file_id* - internal ID for file in file system *free_size* - free space in bytes in device file system			
Response Triggers			
Notes			

Command - **FORMAT**		Command Type - File System	
Command Name		**Permission**	**Transparency**
Set:	**FORMAT**	Administrator	Public
Get:	**-**	-	-
Description		**Syntax**	
Set:	Format file system	#**FORMAT**CR	
Get:	-	-	
Response			
~nn@**FORMAT**SP**OK**CR LF			
Parameters			
Response Triggers			
Notes			
Response could take some time (seconds) until formatting completes			

Command - **FS-FREE?**		Command Type - File System	
Command Name		**Permission**	**Transparency**
Set:	**-**	-	-
Get:	**FS-FREE?**	Administrator	Public
Description		**Syntax**	
Set:	-	-	
Get:	Get file system free space	#**FS-FREE?**CR	
Response			
~nn@**FS_FREE**SP*free_size*CR LF			
Parameters			
free_size - free size in device file system in bytes			
Response Triggers			
Notes			

Command - **GET**		Command Type - File System	
Command Name		**Permission**	**Transparency**
Set:	**-**	-	-
Get:	**GET**	Administrator	Public
Description		**Syntax**	
Set:	-	-	
Get:	Get file	#**GET**SP*file_name*CR	
Response			
Multi-line: ~nn@**GET**SP*file_name, file_size*SP**READY**CR LF *contents* ~nn@**GET**SP*file_name*SP**OK**CR LF			
Parameters			
file_name - name of file to get contents *contents* - byte stream of file contents *file_size* - size of file (device sends it in response to give user a chance to get ready)			
Response Triggers			
Notes			

Command - **LOAD**		Command Type - System - Packets	
Command Name		**Permission**	**Transparency**
Set:	**LOAD**	Administrator	Public
Get:	**-**	-	-
Description		**Syntax**	
Set:	Load file to device	#**LOAD**SP*file_name,size*CR	
Get:	-	-	
Response			
Data sending negotiation: * Device - ~**01@LOAD**SP*file_name,size*SP**READY**CR LF * End User (+Device)- Send file in Protocol Packets * Device - ~**01@LOAD**SP*file_name, size*SP**OK**CR LF**			
Parameters			
file_name - name of file to save on device *size* - size of file data that is sent.			
Response Triggers			
Notes			
See the Protocol Packet reference in Section 4			

2.4 Authentication Commands

Command	Description	Type	Permission
LOGIN	Set/get protocol permission	Security	Not Secure
LOGOUT	Cancel current permission level	Security	Not Secure
PASS	Set/get password for login level	Security	Administrator
SECUR	Set/get current security state	Security	Administrator

Command - **LOGIN**		Command Type - Authentication	
Command Name		**Permission**	**Transparency**
Set:	**LOGIN**	Not Secure	Public
Get:	**LOGIN?**	Not Secure	Public
Description		**Syntax**	
Set:	Set protocol permission	#**LOGIN**SP*login_level, password*CR	
Get:	Get current protocol permission level	#**LOGIN?**CR	
Response			
Set: ~nn@**LOGIN**SP*login_level,password*SP**OK**CR LF or ~nn@**LOGIN**SPERRSP004CR LF (if bad password entered)			
Get: ~nn@**LOGIN**SP*login_level*CR LF			
Parameters			
login_level - level of permissions required (End User or Admin) *password* - predefined password (by PASS command). Default password is an empty string			
Response Triggers			
Notes			
For devices that support security, LOGIN allows to the user to run commands with an End User or Administrator permission level In each device, some connections can be logged in to different levels and some do not work with security at all Connection may logout after timeout The permission system works only if security is enabled with the “SECUR” command			

Command - **LOGOUT**		Command Type - Authentication	
Command Name		**Permission**	**Transparency**
Set:	**LOGOUT**	Not Secure	Public
Get:	**-**	-	-
Description		**Syntax**	
Set:	Cancel current permission level	#**LOGOUT**CR	
Get:	-	-	
Response			
~nn@**LOGOUT**SP**OK**CR LF			
Parameters			
Response Triggers			
Notes			
Logs out from End User or Administrator permission levels to Not Secure			

Command - **PASS**		Command Type - Authentication	
Command Name		**Permission**	**Transparency**
Set:	**PASS**	Administrator	Public
Get:	**PASS?**	Administrator	Public
Description		**Syntax**	
Set:	Set password for login level	#**PASS**SP*login_level, password*CR	
Get:	Get password for login level	#**PASS?**SP*login_level*CR	
Response			
~nn@**PASS**SP*login_level, password*SP**OK**CR LF			
Parameters			
login_level - level of login to set (End User or Administrator). *password* - password for the *login_level*. Up to 15 printable ASCII chars			
Response Triggers			
Notes			
The default password is an empty string			

Command - **SECUR**		Command Type - Authentication	
Command Name		**Permission**	**Transparency**
Set:	**SECUR**	Administrator	Public
Get:	**SECUR?**	Not Secure	Public
Description		**Syntax**	
Set:	Start/stop security	#**SECUR**SP*security_mode*CR	
Get:	Get current security state	#**SECUR?**CR	
Response			
Set: ~nn@**SECUR**SP*security_mode*SP**OK**CR LF Get: ~nn@**SECUR**SP*security_mode*CR LF			
Parameters			
security_mode – 1/ON - enables security, 0/OFF - disables security			
Response Triggers			
Notes			
The permission system works only if security is enabled with the “SECUR” command			

2.5 Switching/Routing Commands

Note: Use the **ROUTE** command in preference to legacy AUD, VID, and AV commands (see below).

Command	Description	Type	Permission
AFV	Set/get audio follow video mode	Switching	End User
AUD	Set/get audio switch state	Switching	End User
AV	Switch audio and video	Switching	Customer
MTX-MODE	Set/get auto-switch mode	Switching	End User
ROUTE	Set/get layer routing	Routing	End User
VID	Set/get video switch state	Switching	End User
VIEW-MOD	Set/get view mode	Routing	End User

Command - **AFV**		Command Type - Switch	
Command Name		**Permission**	**Transparency**
Set:	**AFV**	End User	Public
Get:	**AFV?**	End User	Public
Description		**Syntax**	
Set:	Set audio follow video/audio breakaway mode	#**AFV**SP*afv_mode*CR	
Get:	Get audio follow video mode status	#**AFV?**CR	
Response			
~nn@**AFV**SP*afv_mode*CR LF			
Parameters			
afv_mode - front panel AFV mode 0/afv - sets the unit to the audio-follow-video switching mode 1/brk - sets the unit to the audio breakaway switching mode			
Response Triggers			
Notes			
When the unit moves from breakaway to audio follow video switching mode, all audio switch settings are reset according to the video switch settings.			

Command - **AUD**		Command Type - Switch	
Command Name		**Permission**	**Transparency**
Set:	**AUD**	End User	Public
Get:	**AUD?**	End User	Public
Description		**Syntax**	
Set:	Set audio switch state	#**AUD**SP*in>out, in>out,…*CR	
Get:	Get audio switch state	#**AUD?**SP*out*CR #**AUD?**SP*CR	

Response

Set: ~nn@**AUD**SP*in>out*CR LF
~nn@**AUD**SP*in>out*CR LF …
Get: ~nn@**AUD**SP*in>out*CR LF
~nn@**AUD**SP*in>1,in>2,…*CR LF

Parameters

In - input number or '0' to disconnect output
> - connection character between in and out parameters
out - output number or '*' for all outputs

Response Triggers

Notes

When AFV switching mode is active, this command also switches video and the unit replies with command ~AV

Command - **AV**		Command Type - Switch	
Command Name		**Permission**	**Transparency**
Set:	**AV**	End User	Public
Get:	**-**	-	-
Description		**Syntax**	
Set:	Switch audio and video	#**AV**SP*in>out, in>out,…*CR	
Get:			

Response

~nn@**AV**SP*in>out, in>out,…*CR LF

Parameters

in - input number or '0' to disconnect output
> - connection character between in and out parameters
out - output number or '*' for all outputs

Response Triggers

Notes

Command – **MTX-MODE**		Command Type – Switch	
Command Name		**Permission**	**Transparency**
Set:	**MTX-MODE**	End User	Public
Get:	**MTX-MODE?**	End User	Public
Description		**Syntax**	
Set:	Set auto-switch mode	# **MTX-MODE** SP *output_id, mode* CR	
Get :	Get auto-switch mode	# **MTX-MODE?** SP *output_id* CR	
Response			
~ nn @ **MTX-MODE** SP *output_id,mode* CR			
Parameters			
output_id - 1….num of system outputs *mode* - 0 - manual, 1 - auto priority, 2 - auto last connected			
Response Triggers			
After execution, a response is sent to the com port from which the Set/Get was received After execution, a response is sent to all com ports if MTX-MODE was set by any other external control device (button press, WEB, device menu and similar)			
Notes			
Not recommended for new devices			

Command - **ROUTE**		Command Type - Routing	
Command Name		**Permission**	**Transparency**
Set:	**ROUTE**	End User	Public
Get:	**ROUTE?**	End User	Public
Description		**Syntax**	
Set:	Set layer routing	#**ROUTE** SP *layer, dest, src* CR	
Get:	Get layer routing	#**ROUTE?** SP *layer, dest* CR	
Response			
~ nn @ **ROUTE** SP *layer, dest, src* CR LF			
Parameters			
layer - see Section 5.12 Layer Enumeration *dest* - * - ALL x - disconnect, otherwise destination id *src* - source id			
Response Triggers			
Notes			
This command replaces all other routing commands.			

Command - **VID**		Command Type - Switch	
Command Name		**Permission**	**Transparency**
Set:	**VID**	End User	Public
Get:	**VID?**	End User	Public
Description		**Syntax**	
Set:	Set video switch state	#**VID**SP*in>out, in>out,…*CR	
Get:	Get video switch state	#**VID?**SP*out*CR #**VID?**SP * CR	

Response

Set: ~nn@**VID**SP*in>out* CR LF
~nn@**VID**SP*in>out* CR LF …
Get: ~nn@**VID**SP*in>out* CR LF
~nn@**VID**SP*in>1, in>2*, … CR LF

Parameters

in - input number or '0' to disconnect output
> - connection character between in and out parameters
out - output number or '*' for all outputs

Response Triggers

Notes

When AFV switching mode is active, this command also switches audio and the unit replies with command ~AV.

Examples

When AFV switching mode is active, this command also switches audio and the unit replies with command ~AV.

Switch video and audio input 3 to output 7	#AV 3>7CR	~01@AV 3>7CRLF
Switch video input 2 to output 4	#V 2>4CR	~01@VID 2>4CRLF
Switch video input 4 to output 2 in machine 6	#6@VID 4>2CR	~06@VID 4>2CRLF
Disconnect video and audio output 4	#AV 0>4CR	~01@AV 0>4CRLF
Switch video input 3 to all outputs	#V 3>* CR	~01@VID 3>* CRLF
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>*CRLF ~VID 3>4 CRLF ~VID 2>2 CRLF ~VID 2>1 CRLF ~VID 0>2 CRLF ~VID ERR003 CRLF ~AUD 0>1CRLF ~VID 2>1, 0>2, 1>3, 3>4 CRLF

Command – **VIEW-MOD**		Command Type - Routing	
Command Name		**Permission**	**Transparency**
Set:	**VIEW-MOD**	End User	Public
Get:	**VIEW-MOD?**	End User	Public
Description		**Syntax**	
Set:	Set layer routing	#**VIEW-MOD**SP*out_id,mode*CR	
Get:	Get layer routing	#**VIEW-MOD?**SP*out_id*CR	
Response			
~ nn@ **VIEW-MOD**SP*out_id,mode*CR LF			
Parameters			
out_id - output number *mode* - see Section 5.8 View Modes			
Response Triggers			
Notes			
This command replaces all other routing commands.			

2.6 Video Commands

Command	Description	Type	Permission
BCKGRND	Set/get screen background color	Video	End User
DEF-RES	Set/get custom defined scaled video output resolution to “VIC” index	Video	Administrator
DETAIL-TIMING	Set/get detail timing parameters	Video	End User
GNLCK	Set/get genlock state	Video	End User
H-PHASE	Set/get H-phase	Video	End User
SIG-TYPE	Set/get signal type on input/output	Video	End User
VFRZ	Set/get output freeze	Video	End User
VID-PATTERN	Set/get test pattern on output	Video	End User
VID-RES	Set/get output resolution	Video	End User
VMUTE	Set/get video on output mute	Video	End User

Command - **BCKGRND**		Command Type - Video	
Command Name		**Permission**	**Transparency**
Set:	**BCKGRND**	End User	Public
Get	**BCKGRND?**	End User	Public
Description		**Syntax**	
Set:	Set screen background color	#**BCKGRND**SP*ColSpaceType,p1,p2,p3*CR	
Get:	Get screen background color	#**BCKGRND?**CR	

Response

~nn@**BCKGRND**SP*ColSpaceType,p1,p2,p3*CR LF

Parameters

ColSpaceType - define color space in use (see Section 5.6 Color Space)
p1,p2,p3 - according to color space value:
RGB - R,G,B
YCbCr - Y,Cb,Cr

Response Triggers

After execution, response is sent to the com port from which the Set/Get was received
After execution, response is sent to all com ports if BCKGRND was set by any other external control device (button press, device menu and similar)

Notes

Command - **DEF-RES**		Command Type - Video	
Command Name		**Permission**	**Transparency**
Set	**DEF-RES**	Administrator	Public
Get	**DEF-RES?**	End User	Public
Description		**Syntax**	
Set:	Set custom defined scaled video output resolution to “vic” index	#**DEF-RES**SP Table_id,Width,Height,Htotal,VTotal,HSyncW,HSyncBackPorch, VSyncW,VSyncBackPorch,FrRate,Interlaced CR	
Get:	Get custom defined video resolution	#**DEF-RES?**SP VIC_id, stage, stage_id CR	

Response

~ nn@**DEF-RES**SP
Table_id,Width,Height,Htotal,VTotal,HSyncW,HSyncBackPorch,VSyncW,VSyncBackPorch,FrRate,Interlaced CR LF

Parameters

Table_id - index in resolution table (see Section 5.5 Video Resolutions). Valid indexes for SET are 100-104 only
Custom resolution parameters - by name (self-explanatory), numeric value
Interlaced - interlaced/progressive according to Section 5.1 On/Off (“ON”- I, “OFF” - P)
Stage - input/output (see Section 5.2 Stage)
Stage_id - number of chosen stage (1…max number of inputs/outputs)

Response Triggers

After execution, response is sent to the com port from which the Set/Get was received
After execution, response is sent to all com ports if DEF-RES was set by any other external control device (button press, device menu and similar)

Notes

If a requested custom resolution is not defined, yet is in the device, it returns ERRSP003 (out of range)
Only indexes 100-104 are valid for custom defined resolution
In Get command when sending:
index 0 - device replies with detailed info of native resolution
index 255 - device replies with detailed info of current resolution

Command - **DETAIL-TIMING**		Command Type - Video	
Command Name		**Permission**	**Transparency**
Set:	**DETAIL-TIMING**	End User	Public
Get:	**DETAIL-TIMING?**	End User	Public
Description		**Syntax**	
Set:	Set detail timing parameters	#**DETAIL-TIMING**SP*param, channel, value*CR	
Get:	Get detail timing parameters	#@**DETAIL-TIMING?**SP*param, channe*CR LF	
Response			
Set / Get: ~nn@**DETAIL-TIMING**SP*param, channel, value*CR LF			
Parameters			
param – See Section 5.10 Detail Timing Parameters *channel* - input number *value* - video parameter in Kramer units, minus sign precedes negative values ++ increase current value, -- decrease current value			
Response Triggers			
Notes			

Command - **GNLCK**		Command Type - Video	
Command Name		**Permission**	**Transparency**
Set:	**GNLCK**	Administrator	Public
Get:	**GNLCK?**	End User	Public
Description		**Syntax**	
Set:	Set genlock source and mode	#**GNLCK**SP*out,in,type*CR	
Get:	Get genlock source, mode and status	#**GNLCK?**SP*out*CR	
Response			
Set / Get: ~ nn@**GNLCK**SP*out,in,status* CR LF			
Parameters			
out - output number (1 .. max number of outputs) *in* - input number (1… max number of inputs) *type* - genlock type (see Section 5.4 Genlock Types) *status* - genlock status (ON/OFF) (see Section 5.1 On/Off)			
Response Triggers			
Response is sent to the com port from which the Set (before execution) **/** Get command was received After execution, response is sent to all com ports if GNLCK was set for any other external control device (button press, device menu and similar) or genlock status changed			
Notes			

Command - **H-PHASE**		Command Type - Video	
Command Name		**Permission**	**Transparency**
Set:	**H-PHASE**	End User	Public
Get:	**H-PHASE?**	End User	Public
Description		**Syntax**	
Set:	Set H-phase	#**H-PHASE** SP *stage, channel, value* CR	
Get:	Get H-phase	#**H-PHASE?** SP *stage, channel* CR	
Response			
Set / Get: ~nn@**H-PHASE** SP *stage, channel, value* CR LF			
Parameters			
stage - 'IN, 'OUT' or numeric value of present video processing stage For example: '1' for input value, '2' for output *channel* - input or output number *value* - video parameter in Kramer units, minus sign precedes negative values ++ increase current value, -- decrease current value			
Response Triggers			
Notes			

Command - **SIG-TYPE**		Command Type - Video	
Command Name		**Permission**	**Transparency**
Set:	**SIG-TYPE**	End User	Public
Get	**SIG-TYPE?**	End User	Public
Description		**Syntax**	
Set:	Set signal type on input/output	#**SIG-TYPE** SP *stage, stage_id,type* CR	
Get:	Get signal type on input/output	#**SIG-TYPE?** SP *stage,stage_id* CR	
Response			
~ nn@**SIG-TYPE** SP *stage,stage_id,type* CR LF			
Parameters			
stage - input/output (see Section 5.2 Stage) *stage_id* - number of chosen stage (1.. max number of inputs/outputs) *type* - signal type (see 5.3 Signal Type)			
Response Triggers			
After execution, response is sent to the com port from which the Set/Get was received After execution, response is sent to all com ports if SIG-TYPE was set by any other external control device (button press, device menu and similar)			
Notes			
"Set" command is not available for all devices (refer to device specifications)			

Command - **VFRZ**		Command Type - Multiviewer	
Command Name		**Permission**	**Transparency**
Set:	**VFRZ**	End User	Public
Get	**VFRZ?**	End User	Public
Description		**Syntax**	
Set:	Set freeze on selected output	#**VFRZ** SP *out_id,freeze_flag* CR	
Get:	Get output freeze status	#**VFRZ?** SP *out_id* CR	
Response			
~ nn@**VFRZ** SP *win_num, freeze_flag* CR LF			
Parameters			
out_id -output number *freeze_flag* - see Section 5.1 On/Off			
Response Triggers			
After execution, response is sent to the com port from which the Set/Get was received After execution, response is sent to all com ports if VFRZ was set by any other external control device (button press, device menu and similar)			
Notes			

Command – **VID-PATTERN**		Command Type – Video	
Command Name		**Permission**	**Transparency**
Set:	**VID-PATTERN**	End User	Public
Get:	**VID-PATTERN?**	End User	Public
Description		**Syntax**	
Set:	Set test pattern on output	#**VID-PATTERN** SP *output_id,pattern_id* CR	
Get :	Get test pattern on output	#**VID-PATTERN?** SP *output_id* CR	
Response			
~ nn@**VID-PATTERN** SP *output_id,pattern_id* CR			
Parameters			
output_id - 1….num of system outputs *pattern_id* - 1…num of system patterns			
Response Triggers			
After execution, response is sent to the com port from which the Set/Get was received After execution, response is sent to all com ports if VID-PATTERN was set by any other external control device (button press, WEB, device menu and similar)			
Notes			

Command - **VID-RES**		Command Type - Video	
Command Name		**Permission**	**Transparency**
Set:	**VID-RES**	End User	Public
Get	**VID-RES?**	End User	Public
Description		**Syntax**	
Set:	Set output resolution	#**VID-RES**SP*stage, stage_id,is_native,resolution*CR	
Get:	Get output resolution	#**VID-RES?**SP*stage,stage_id,is_native*CR	

Response

~ nn@**VID-RES**SP*stage,stage_id,is_native,resolution*CR LF

Parameters

stage - input/output (see Section 5.2 Stage)
stage_id - number of chosen stage (1... max number of inputs/outputs)
is_native - native resolution flag (see Section 5.1 On/Off)
resolution - resolution index (see Section 5.5 Video Resolutions)

Response Triggers

After execution, response is sent to the com port from which the Set/Get was received

After execution, response is sent to all com ports if VID-RES was set by any other external control device (button press, device menu and similar)

Notes

"Set" command is only applicable for stage=Output

"Set" command with *is_native*=ON sets native resolution on selected output (resolution index sent = 0). Device sends as answer actual VIC ID of native resolution

"Get" command with *is_native*=ON returns native resolution VIC, with *is_native*=OFF returns current resolution

To use "custom resolutions" (entries 100-105 in Section 5.8 View Modes

Number	Value
0	PIP off
1	PIP on
2	Preview

Custom Resolution Parameters), define them using the DEF-RES command

Command - **VMUTE**		Command Type - Video	
Command Name		**Permission**	**Transparency**
Set:	**VMUTE**	End User	Public
Get:	**VMUTE?**	End User	Public
Description		**Syntax**	
Set:	Set enable/disable video on output	#**VMUTE**SP*output_id, flag*CR	
Get:	Get video on output status	#**VMUTE?**SP CR	
Response			
Set / Get: ~ nn@ **VMUTE**SP*output_id, flag*CR LF			
Parameters			
output_id - 1….num of system outputs flag - 0 - disable video on output 1 - enable video on output			
Response Triggers			
Notes			

2.7 Audio Commands

These commands are used by audio devices running Protocol 3000.

Command	Description	Type	Permission
AUD-EMB	Set/get audio in video embedding status	Audio	End user
AUD-LVL	Set/get audio level in specific amplifier stage	Audio	End User
AUD-SIGNAL?	Get audio input signal status	Audio	End user
BALANCE	Set/get balance level	Audio	End User
BASS	Set/get audio bass level	Audio	End User
EQ-LVL	Set/get equalization level	Audio	End User
LOUDNESS	Set/get audio loudness	Audio	End User
MIC-GAIN	Set/get microphone gain	Audio	End User
MIDRANGE	Set/get audio midrange level	Audio	End User
MIX	Set/get audio mix	Audio	End User
MIX-LVL	Set/get mixing level of selected output	Audio	End User
MUTE	Set/get audio mute	Audio	End User
STEREO	Set/get stereo audio	Audio	End User
TLK	Set/get audio talkover	Audio	End User
TREBLE	Set/get audio treble level	Audio	End User

Command - **AUD-EMB**		Command Type - Common	
Command Name		**Permission**	**Transparency**
Set:	**AUD-EMB**	End User	Public
Get:	**AUD-EMB?**	End User	Public
Description		**Syntax**	
Set:	Set audio in video embedding status	#**AUD-EMB** SP *in,out,status* CR	
Get:	Get audio in video embedding status	#**AUD-EMB?** SP *in,out* CR	
Response			
Set/Get: ~ nn@**AUD-EMB** SP *in,out,status* CR LF			
Parameters			
in - audio input to be embedded number (1… max number of inputs) *out* - video output to embed into number (1 .. max number of outputs) *status* - embedded (ON), or not (OFF) status (see Section 5.1 On/Off)			
Response Triggers			
Response is sent to the com port from which the Set (before execution)/Get command was received After execution, response is sent to all com ports if AUD-EMB was set by any other external control device (button press, device menu and similar)			
Notes			

Command - **AUD-LVL**		Command Type - Audio	
Command Name		**Permission**	**Transparency**
Set:	**AUD-LVL**	End User	Public
Get:	**AUD-LVL?**	End User	Public
Description		**Syntax**	
Set:	Set audio level in specific amplifier stage	#**AUD-LVL** SP *stage, channel, volume* CR	
Get:	Get audio level in specific amplifier stage	#**AUD-LVL?** SP *stage, channel* CR	
Response			
~nn@**AUD-LVL** SP *stage, channel, volume* CR LF			
Parameters			
stage - 'IN, 'OUT' or numeric value of present audio processing stage For example: '1' for input level, '2' for output *channel* - input or output number *volume* - audio parameter in Kramer units, minus sign precedes negative values. ++ increase current value, -- decrease current value			
Response Triggers			
Notes			

Command - **AUD-SIGNAL**		Command Type - Audio	
Command Name		**Permission**	**Transparency**
Set:	-	-	-
Get	**AUD-SIGNAL?**	End User	Public
Description		**Syntax**	
Set:	-	-	
Get:	Get audio input signal status	# **AUD-SIGNAL?** SP *inp_id* CR	
Response			
~ nn @ **AUD-SIGNAL** SP *inp_id, status* CR LF			
Parameters			
Inp_id - input number (1 .. max input number) *status* - 0 - OFF (no signal) 1 - ON (signal present			
Response Triggers			
After execution, response is sent to the com port from which the Get was received Response is sent to all com ports if audio status state was changed on any input			
Notes			

Command - **BALANCE**		Command Type - Audio	
Command Name		**Permission**	**Transparency**
Set:	**BALANCE**	End User	Public
Get:	**BALANCE?**	End User	Public
Description		**Syntax**	
Set:	Set balance level	#**BALANCE** SP *out_channel, balance_level* CR	
Get:	Get balance level	#**BALANCE?** SP *out_channel* CR	
Response			
~ nn @**BALANCE** SP *out_channel, balance_level* CR LF			
Parameters			
out_channel - output number *balance_level* - audio parameter in Kramer units, minus sign precedes negative values ++ increase current value -- decrease current value			
Response Triggers			
Notes			

Command - **BASS**		Command Type - Audio	
Command Name		**Permission**	**Transparency**
Set:	**BASS**	End User	Public
Get:	**BASS?**	End User	Public
Description		**Syntax**	
Set:	Set audio bass level	#**BASS**SP*channel, bass_level*CR	
Get:	Get audio bass level	#**BASS?**SP*channel*CR	
Response			
~nn@**BASS**SP*channel, bass_level*CR LF			
Parameters			
channel - input or output number *bass_level* - audio parameter in Kramer units, minus sign precedes negative values ++ increase current value -- decrease current value			
Response Triggers			
Notes			

Command – **EQ-LVL**		Command Type – Audio	
Command Name		**Permission**	**Transparency**
Set:	**EQ-LVL**	End User	Public
Get:	**EQ-LVL?**	End User	Public
Description		**Syntax**	
Set:	Set equalization level	# **EQ-LVL**SP*P1,P2,P3*CR	
Get :	Get equalization level	# **EQ-LVL?**SP*P1,P2*CR	
Response			
Set / Get : ~ nn@**EQ-LVL**SP*P1,P2,P3*CR LF			
Parameters			
P1 - audio output number – 0-audio out, 1-Scaler1, 2-Scaler2 *P2* - frequency number – See Section 5.21 Frequency Number *P3* – audio level – See Section5.21 5.22 Audio Level			
Response triggers			
Response is sent to the com port from which the Set (before execution) / Get command was received After execution, response is sent to all com ports if CMD-NAME was set any other external control device (button press, device menu and similar) or genlock status was changed			
Notes			
Sets the EQ level for the selected frequency of the selected audio output			

Command - **LOUDNESS**		Command Type - Audio	
Command Name		**Permission**	**Transparency**
Set:	**LOUDNESS**	End User	Public
Get:	**LOUDNESS?**	End User	Public
Description		**Syntax**	
Set:	Set audio loudness	#**LOUDNESS** SP *channel, loudness* CR	
Get:	Get audio loudness	#**LOUDNESS?** SP *channel* CR	
Response			
~nn@**LOUDNESS** SP *channel, loudness* CR LF			
Parameters			
channel - input or output number *loudness* - 0 or OFF / 1 or ON			
Response Triggers			
Notes			

Command – **MIC-GAIN**		Command Type – Audio	
Command Name		**Permission**	**Transparency**
Set:	**MIC-GAIN**	End User	Public
Get:	**MIC-GAIN?**	End User	Public
Description		**Syntax**	
Set:	Set the microphone gain	# **MIC-GAIN** SP *P1,P2* CR	
Get :	Get the microphone gain	# **MIC-GAIN?** SP *P1* CR	
Response			
Set / Get : ~ nn@**MIC-GAIN** SP *P1,P2* CR LF			
Parameters			
P1 - Input number, for VP-553 always 0 *P2* - level – 0 to 100			
Response Triggers			
Response is sent to the com port from which the Set (before execution) / Get command was received After execution, response is sent to all com ports if CMD-NAME was set any other external control device (button press, device menu and similar) or genlock status was changed			
Notes			
Sets the microphone input audio gain			

Command - **MIDRANGE**		Command Type - Audio	
Command Name		**Permission**	**Transparency**
Set:	**MIDRANGE**	End User	Public
Get:	**MIDRANGE?**	End User	Public
Description		**Syntax**	
Set:	Set audio midrange level	#**MIDRANGE** SP *channel, midrange_level* CR	
Get:	Get audio midrange level	#**MIDRANGE?** SP *channel* CR	
Response			
~nn@**MIDRANGE** SP *channel, midrange_level* CR LF			
Parameters			
channel - input or output number *midrange_level* - audio parameter in Kramer units, minus sign precedes negative values ++ increase current value -- decrease current value			
Response Triggers			
Notes			

Command - **MIX**		Command Type - Audio	
Command Name		**Permission**	**Transparency**
Set:	**MIX**	End User	Public
Get:	**MIX?**	End User	Public
Description		**Syntax**	
Set:	Set audio MIX	#**MIX** SP *channel, mix_mode* CR	
Get:	Get audio MIX	#**MIX?** CR	
Response			
~nn@**MIX** SP *channel, mix_mode* CR LF			
Parameters			
channel - output number *mix_mode* - 0 or OFF / 1 or ON			
Response Triggers			
Notes			

Command – **MIX-LVL**		Command Type – Audio	
Command Name		**Permission**	**Transparency**
Set:	**MIX-LVL**	End User	Public
Get:	**MIX-LVL?**	End User	Public
Description		**Syntax**	
Set:	Set mixing level of selected output	# **MIX-LVL**SP*P1,P2*CR	
Get :	Get mixing level of selected output	# **MIX-LVL?**SP*P1*CR	
Response			
Set / Get : ~ nn@**MIX-LVL**SP*P1,P2*CR LF			
Parameters			
P1 - output number *P2* – mixing level - 0 to 100			
Response triggers			
Response is sent to the com port from which the Set (before execution) / Get command was received After execution, response is sent to all com ports if CMD-NAME was set any other external control device (button press, device menu and similar) or genlock status was changed			
Notes			
Sets the mixing level between the audio of the selected video In and the selected AUX audio channel			

Command - **MUTE**		Command Type - Audio	
Command Name		**Permission**	**Transparency**
Set:	**MUTE**	End User	Public
Get:	**MUTE?**	End User	Public
Description		**Syntax**	
Set:	Set audio mute	#**MUTE**SP*channel,mute_mode*CR	
Get:	Get audio mute	#**MUTE?**SP*channel*CR	
Response			
~nn@**MUTE**SP*channel, mute_mode*CR LF			
Parameters			
channel - output number *mute_mode* - 0 or OFF / 1 or ON			
Response Triggers			
Notes			

Command - **STEREO**		Command Type - Audio	
Command Name		**Permission**	**Transparency**
Set:	**STEREO**	End User	Public
Get:	**STEREO?**	End User	Public
Description		**Syntax**	
Set:	Set stereo audio	#**STEREO**[SP]*stereo_mode*[CR]	
Get:	Get stereo audio	#**STEREO?**[CR]	
Response			
~[nn]@**STEREO**[SP]*stereo_mode*[CR LF]			
Parameters			
stereo_mode - 0 or OFF / 1 or ON			
Response Triggers			
Notes			

Command - **TLK**		Command Type - Audio	
Command Name		**Permission**	**Transparency**
Set:	**TLK**	End User	Public
Get:	**TLK?**	End User	Public
Description		**Syntax**	
Set:	Set audio talkover	#**TLK**[SP]*talkover_mode*[CR]	
Get:	Get audio talkover	#**TLK?**[CR]	
Response			
~[nn]@**TLK**[SP]*talkover_mode*[CR LF]			
Parameters			
talkover_mode - 0 or OFF / 1 or ON			
Response Triggers			
Notes			

Command - **TREBLE**		Command Type - Audio	
Command Name		**Permission**	**Transparency**
Set:	**TREBLE**	End User	Public
Get:	**TREBLE?**	End User	Public
Description		**Syntax**	
Set:	Set audio treble level	#**TREBLE** SP *channel, treble_level* CR	
Get:	Get audio treble level	#**TREBLE?** SP *channel* CR	
Response			
~nn@**TREBLE** SP *channel, treble_level* CR LF			
Parameters			
channel - input or output number *treble_level* - audio parameter in Kramer units, minus sign precedes negative values ++ increase current value -- decrease current value			
Response Triggers			
Notes			

2.8 Communication Commands

These commands are used by network devices running Protocol 3000.

Command	Description	Type	Permission
ETH-PORT	Set/get Ethernet port protocol	Communication	Administrator
NET-DHCP	Set/get DHCP mode	Communication	Administrator
NET-GATE	Set/get gateway IP	Communication	Administrator
NET-IP	Set/get IP address	Communication	Administrator
NET-MAC?	Get MAC address	Communication	End User
NET-MASK	Set/get subnet mask	Communication	Administrator
TIME-SRV	Set/get time server	Communication	Administrator
UART	Set/get com port configuration	Communication	Administrator
UDP-TOUT	Set/get UDP client timeout	Communication	Administrator

Command - **ETH-PORT**		Command Type - Communication	
Command Name		**Permission**	**Transparency**
Set:	**ETH-PORT**	Administrator	Public
Get:	**ETH-PORT?**	End User	Public
Description		**Syntax**	
Set:	Set Ethernet port protocol	#**ETH-PORT**[SP]*portType, ETHPort, portNum*[CR]	
Get:	Get Ethernet port protocol	#**ETH-PORT?**[SP]*portType*, *portNum*[CR]	
Response			
~nn@ **ETH-PORT**[SP]*portType, ETHPort, portNum*[CR LF]			
Parameters			
portNum - 1-4 TCP/UDP port enumerator (equals the connected com port number from the tunneling port) *portType* - TCP/UDP *ETHPort* - TCP/UDP port number			
Response Triggers			
Notes			

Command - **NET-DHCP**		Command Type - Communication	
Command Name		**Permission**	**Transparency**
Set:	**NET-DHCP**	Administrator	Public
Get:	**NET-DHCP?**	End User	Public
Description		**Syntax**	
Set:	Set DHCP mode	#**NET-DHCP**SP*mode*CR	
Get:	Get DHCP mode	#**NET-DHCP?**CR	
Response			
Set: ~nn@ **NET-DHCP**SP*mode*SP**OK**CR LF Get: ~nn@ **NET-DHCP**SP*mode*CR LF			
Parameters			
mode - 0 - Do not use DHCP. Use the IP set by the factory or using the IP set command 1 - Try to use DHCP. If unavailable, use IP as above			
Response Triggers			
Notes			
Connecting Ethernet to devices with DHCP may take more time in some networks To connect with a randomly assigned IP by DHCP, specify the device DNS name (if available) using the command “NAME”. You can also get an assigned IP by direct connection to USB or RS-232 protocol port if available For proper settings consult your network administrator			

Command - **NET-GATE**		Command Type - Communication	
Command Name		**Permission**	**Transparency**
Set:	**NET-GATE**	Administrator	Public
Get:	**NET-GATE?**	End User	Public
Description		**Syntax**	
Set:	Set gateway IP	#**NET-GATE**SP *ip_address*CR	
Get:	Get gateway IP	#**NET-GATE?**CR	
Response			
Set: ~nn@**NET-GATE**SP*ip_address*SP**OK**CR LF Get: ~nn@**NET-GATE**SP*ip_address*CR LF			
Parameters			
ip_address - format: xxx.xxx.xxx.xxx			
Response Triggers			
Notes			
A network gateway connects the device via another network and maybe over the Internet. Be careful of security problems. For proper settings consult your network administrator			

Command - **NET-IP**		Command Type - Communication	
Command Name		**Permission**	**Transparency**
Set:	**NET-IP**	Administrator	Public
Get:	**NET-IP?**	End User	Public
Description		**Syntax**	
Set:	Set IP address	#**NET-IP**SP*ip_address*CR	
Get:	Get IP address	#**NET-IP?**CR	
Response			
Set: ~nn@ **NET-IP**SP*ip_address*SP**OK**CR LF			
Get: ~nn@ **NET-IP**SP*ip_address*CR LF			
Parameters			
ip_address - format: xxx.xxx.xxx.xxx			
Response Triggers			
Notes			
For proper settings consult your network administrator			

Command - **NET-MAC?**		Command Type - Communication	
Command Name		**Permission**	**Transparency**
Set:	**-**	-	-
Get:	**NET-MAC?**	End User	Public
Description		**Syntax**	
Set:	-	-	
Get:	Get MAC address	#**NET-MAC?**CR	
Response			
~nn@**NET-MAC**SP*mac_address*CR LF			
Parameters			
mac_address - Unique MAC address. Format: XX-XX-XX-XX-XX-XX where X is hex digit			
Response Triggers			
Notes			

Command - **NET-MASK**		Command Type - Communication	
Command Name		**Permission**	**Transparency**
Set:	**NET-MASK**	Administrator	Public
Get:	**NET-MASK?**	End User	Public
Description		**Syntax**	
Set:	Set subnet mask	#**NET-MASK**SP*net_mask*CR	
Get:	Get subnet mask	#**NET-MASK?**CR	
Response			
Set: ~nn@**NET-MASK**SP*net_mask*SP**OK**CR LF Get: ~nn@**NET-MASK**SP*net_mask*CR LF			
Parameters			
net_mask - format: xxx.xxx.xxx.xxx			
Response Triggers			
The subnet mask limits the Ethernet connection within the local network For proper settings consult your network administrator			
Notes			

Command - **TIME-SRV**		Command Type - Communication	
Command Name		**Permission**	**Transparency**
Set:	**TIME-SRV**	Administrator	Public
Get:	**TIME-SRV?**	End User	Public
Description		**Syntax**	
Set:	Set time server	#**TIME-SRV**SP*mode, time_server_IP, time_server_Sync_Hour*,CR	
Get:	Get time server	#**TIME-SRV?**SP CR	
Response			
~ nn@**TIME-SRV**SP *mode, time_server_IP, time_server_Sync_Hour,server_status* CR LF			
Parameters			
mode - 0 - OFF, 1 - ON *time_server_IP* - time server IP address *time_server_Sync_Hour* - hour in day for time server sync *server_status – ON/OFF*			
Response Triggers			
Notes			
This command is needed for setting UDP timeout for the current client list			

Command - **UART**		Command Type - Communication	
Command Name		**Permission**	**Transparency**
Set:	**UART**	Administrator	Public
Get:	**UART?**	End User	Public
Description		**Syntax**	
Set:	Set com port configuration	# **UART**SP*COM_Num, baud_rate, data_bit, parity, stop_bit*CR	
Get:	Get com port configuration	# **UART?**SP*COM_Num*CR	

Response

Set: ~ nn@ **UART**SP*COM_Num, baud_rate, data_bit, parity, stop_bit*CR LF

Get: ~ nn@ **UART**SP*COM_Num, baud_rate, data_bit, parity, stop_bit, serial1_type, 485_term*CR LF

Parameters

COM_Num - 1-4
baud_rate - 9600 - 115200
data_bit - 7-8
parity - 'N', 'O', 'E', 'M', 'S' (see Section 5.18 Parity Types)
stop_bit - 1-2
serial1_type - 232/485 (see Section 5.19 Serial Types)
485_term - 1/0 (optional - this exists exist only when serial1_type = 485)

Response Triggers

Notes

In the FC-2x the serial port is selectable to RS-232 or RS-485 (usually serial port 1).
If Serial1 is configured when RS-485 is selected, the RS-485 UART port is automatically changed

Command - **UDP-TOUT**		Command Type - Communication	
Command Name		**Permission**	**Transparency**
Set:	**UDP-TOUT**	Administrator	Public
Get:	**UDP-TOUT?**	End User	Public
Description		**Syntax**	
Set:	Set UDP client timeout	#**UDP-TOUT**SP*timeout_value, timeout_mode*CR	
Get:	Get UDP client timeout	#**UDP-TOUT?**SP CR	

Response

~ nn@**UDP-TOUT**SP*timeout_value, timeout_mode*CR LF

Parameters

timeout_value - 0 - 43200 sec (0 - 12H)
timeout_mode - 0 - 3 (NO_TOUT/PROTOCOL_PORTS_ONLY/ /ALL_PORTS)

Response Triggers

Notes

This command is needed for setting UDP timeout client current client list

2.9 Multiviewer/Scaler Commands

Command	Description	Type	Permission
BRIGHTNESS	Set/get window brightness	Multiviewer	End User
CONTRAST	Set/get window contrast	Multiviewer	End User
CRDT	Set/get window size and position	Multiviewer	End User
IMAGE-PROP	Set/get the image size	Multiviewer	End User
OVRL	Set/get text overlay parameters	Multiviewer	End User
OVRLBK	Set/get text overlay background parameters	Multiviewer	End User
OVRLTXT	Set/get overlay text	Multiviewer	End User
SCLR-AS	Set/get auto-sync features	Multiviewer	End User
SCLR-AUDIO-DELAY	Set audio delay for selected audio output	Multiviewer	End User
SCLR-PCAUTO	Set PC auto sync of selected scaler	Multiviewer	End User
SHOW-OSD	Set/get OSD display	Multiviewer	End User
W-ACTIVE	Set/get active window	Multiviewer	End User
W-BRD	Set/get window border	Multiviewer	End User
W-COLOR	Set/get window color intensity	Multiviewer	End User
W-ENABLE	Set/get window visibility	Multiviewer	End User
W-FRZ	Set/get freeze on selected window	Multiviewer	End User
W-HUE	Set/get window hue value	Multiviewer	End User
W-LAYER	Set/get window overlay order OR Set/get ALL window overlay order	Multiviewer	End User
W-POS	Set/get window position	Multiviewer	End User
W-SHARP	Set/get window sharpness value	Multiviewer	End User
W-SRC	Set/get window source	Multiviewer	End User
W-ZOOM	Set/get windows zoom	Multiviewer	End User

Command - **BRIGHTNESS**		Command Type - Multiviewer	
Command Name		**Permission**	**Transparency**
Set:	**BRIGHTNESS**	End User	Public
Get	**BRIGHTNESS?**	End User	Public
Description		**Syntax**	
Set:	Set window brightness	#**BRIGHTNESS**SP*win_num,value*CR	
Get:	Get window brightness	#**BRIGHTNESS?**SP*win_num*CR	
Response			
~nn@**BRIGHTNESS**SP*win_num, value*CR LF			
Parameters			
win_num - window number setting brightness *value* - brightness value			
Response Triggers			
After execution, response is sent to the com port from which the Set/Get was received After execution, response is sent to all com ports if BRIGHTNESS was set by any other external control device (button press, device menu and similar)			
Notes			
Value limits can vary for different devices Value is a property of input connected to current window. Changing window input source might cause changes in this value (refer device definitions)			

Command - **CONTRAST**		Command Type - Multiviewer	
Command Name		**Permission**	**Transparency**
Set:	**CONTRAST**	End User	Public
Get	**CONTRAST?**	End User	Public
Description		**Syntax**	
Set:	Set window contract	#**CONTRAST**SP*win_num, value*CR	
Get:	Get window contract	#**CONTRAST?**SP*win_num*CR	
Response			
~nn@**CONTRAST**SP*win_num, value*CR LF			
Parameters			
win_num - window number setting contrast *value* - contrast value			
Response Triggers			
After execution, response is sent to the com port from which the Set/Get was received After execution, response is sent to all com ports if CONTRAST was set by any other external control device (button press, device menu and similar)			
Notes			
Value limits can vary for different devices Value is a property of input connected to current window. Changing the window input source might cause changes in this value (refer to device definitions)			

Command - **CRDT**		Command Type - Multiviewer	
Command Name		**Permission**	**Transparency**
Set:	**CRDT**	End User	Public
Get	**CRDT?**	End User	Public
Description		**Syntax**	
Set:	Set window size and position	#**CRDT**SP*win_num,x0,y0,x1,y1*CR	
Get:	Get window size and position	#**CRDT?**SP*win_num*CR	
Response			
Set: ~ nn@**CRDT**SP*win_num,x0,y0,x1,y1[result]*CR LF Get: ~ nn@**CRDT**SP*win_num,x0,y0,x1,y1*CR LF			
Parameters			
Set: *win_num* - 1-4; x0,y0 - top-left coordinate, *x1, y1* - bottom-right coordinate Get: *x0,x1* <=180 *y0,y1* <=144(for PAL) *y0,y1* <= 120(for NTSC) *win_num* = 1-4 or 0 (for output window)			
Response Triggers			
Notes			

Command – **IMAGE-PROP**		Command Type – Multiviewer/Scaler	
Command Name		**Permission**	**Transparency**
Set:	**IMAGE-PROP**	End User	Public
Get:	**IMAGE-PROP?**	End User	Public
Description		**Syntax**	
Set:	Set the image size	# **IMAGE-PROP**SP*P1*CR	
Get :	Get the image size	# **IMAGE-PROP?**SP*P1,…,P6*CR	
Response			
Set / Get : ~ nn@**IMAGE-PROP**SP*P1,P2….* CR LF			
Parameters			
P1 - scaler number - 1-Scaler1, 2-Scaler2 *P2* – status – See Section 5.7 5.6Image Properties			
Response triggers			
Response is sent to the com port from which the Set (before execution) / Get command was received After execution, response is sent to all com ports if CMD-NAME was set any other external control device (button press, device menu and similar) or genlock status was changed			
Notes			
Sets the image properties of the selected scaler			

Command - **OVRL**		Command Type - Multiviewer	
Command Name		**Permission**	**Transparency**
Set:	**OVRL**	End User	Public
Get	**OVRL?**	End User	Public
Description		**Syntax**	
Set:	Set text overlay parameters	#**OVRL**SP*stage, stage_id,mode,r,g,b,alpha*CR	
Get:	Get text overlay parameters	#**OVRL?**SP*stage, stage_id*CR	

Response

~ nn@**OVRL**SP*stage, stage_id,mode,r,g,b,alpha*CR LF

Parameters

stage - input/output (see Section 5.2 Stage)
stage_id - number of chosen stage (1.. max number of inputs/outputs)
mode - show/ hide text overlay string (see Section 5.1 On/Off)
r - red component value (0-255)
g - green component value (0-255)
b - blue component value (0-255)
alpha - alpha value (0-255)

Response Triggers

After execution, response is sent to the com port from which the Set/Get was received

After execution, response is sent to all com ports if OVRL was set by any other external control device (button press, device menu and similar)

Notes

Command - **OVRLBK**		Command Type - Multiviewer	
Command Name		**Permission**	**Transparency**
Set:	**OVRLBK**	End User	Public
Get	**OVRLBK?**	End User	Public
Description		**Syntax**	
Set:	Set text overlay background parameters	#**OVRLBK**SP*stage, stage_id,r,g,b,alpha*CR	
Get:	Get text overlay background parameters	#**OVRLBK?**SP*stage, stage_id*CR	

Response

~ nn@**OVRLBK**SP*stage, stage_id,r,g,b,alpha*CR LF

Parameters

stage - input/output - set reference to Section 5.2 Stage
stage_id - number of chosen stage (1.. max number of inputs/outputs)
r - red component value (0-255)
g - green component value (0-255)
b - blue component value (0-255)
alpha - alpha value (0-255)

Response Triggers

After execution, response is sent to the com port from which the Set/Get was received

After execution, response is sent to all com ports if OVRLBK was set by any other external control device (button press, device menu and similar)

Notes

Command - **OVRLTXT**		Command Type - Multiviewer	
Command Name		**Permission**	**Transparency**
Set:	**OVRLTXT**	End User	Public
Get	**OVRLTXT?**	End User	Public
Description		**Syntax**	
Set:	Set overlay text	#**OVRLTXT**SP*stage,stage_id,type,size,x,y,string*CR	
Get:	Get overlay text	#**OVRLTXT?**SP*stage,stage_id*CR	

Response

~ nn@**OVRLTXT**SP*stage,stage_id,type,size,x,y,string*CR LF

Parameters

stage - input/output (see Section 5.2 Stage)
stage_id - number of chosen stage (1.. max number of inputs/outputs)
type - font type (only 0 supported currently, TBD)
size - font size (see Section 5.11 Font Size) for values
x - horizontal alignment (0 - Left, 1- Centered, 2- Right)
y - vertical alignment (0 - Top, 1- Centered, 2- Bottom)
string - tile text (up to 10 characters)

Response Triggers

After execution, response is sent to the com port from which the Set/Get was received

After execution, response is sent to all com ports if OVRLTXT was set by any other external control device (button press, device menu and similar)

Notes

Command – **SCLR-AS**		Command Type – Multiviewer/Scaler	
Command Name		**Permission**	**Transparency**
Set:	**SCLR-AS**	End User	Public
Get:	**SCLR-AS?**	End User	Public
Description		**Syntax**	
Set:	Set auto-sync features	# **SCLR-AS** SP *P1,P2* CR	
Get :	Get auto-sync features	# **SCLR-AS?** SP *P1* CR	
Response			
Set / Get : ~ nn@ **SCLR-AS** SP *P1,P2….* CR LF			
Parameters			
P1 – scaler Number – 1-Scaler1, 2-Scaler2 *P2* – On/Off – See Section 5.1 On/Off			
Response triggers			
Response is sent to the com port from which the Set (before execution) / Get command was received After execution, response is sent to all com ports if CMD-NAME was set any other external control device (button press, device menu and similar) or genlock status was changed			
Notes			
Sets the auto sync features for the selected scaler			

Command – **SCLR-AUDIO-DELAY**		Command Type – Multiviewer/Scaler	
Command Name		**Permission**	**Transparency**
Set:	**SCLR-AUDIO-DELAY**	End User	Public
Get:	**SCLR-AUDIO-DELAY?**	End User	Public
Description		**Syntax**	
Set:	Set the scaler audio delay	# **SCLR-AUDIO-DELAY** SP *P1,P2* CR	
Get :	Get the scaler audio delay	# **SCLR-AUDIO-DELAY?** SP *P1* CR	
Response			
Set / Get : ~ nn@**SCLR-AUDIO-DELAY** SP *P1,P2* CR LF			
Parameters			
P1 - audio output number – 0-audio out, 1-Scaler1, 2-Scaler2 *P2* - delay – See Section 5.225.23 Audio Delay			
Response triggers			
Response is sent to the com port from which the Set (before execution) / Get command was received After execution, response is sent to all com ports if CMD-NAME was set any other external control device (button press, device menu and similar) or genlock status was changed			
Notes			
Sets the audio delay for the selected audio output			

Command – **SCLR-PCAUTO**		Command Type – Multiviewer/Scaler	
Command Name		**Permission**	**Transparency**
Set:	**SCLR-PCAUTO**	End User	Public
Get:	**-**	-	-
Description		**Syntax**	
Set:	Set PC auto sync of scaler	# **SCLR-PCAUTO**SP*P1,P2*CR	
Get :	-	-	
Response			
Set / Get : ~ nn@ **SCLR-PCAUTO**SP*P1,P2….* CR LF			
Parameters			
P1 - Scaler number – 1-Scaler1, 2-Scaler2 *P2* - Off/On – See Section 5.1 On/Off			
Response triggers			
Response is sent to the com port from which the Set (before execution) / Get command was received After execution, response is sent to all com ports if CMD-NAME was set any other external control device (button press, device menu and similar) or genlock status was changed			
Notes			
Sets the PC auto sync of the selected scaler			

Command – **SHOW-OSD**		Command Type – Multiviewer/Scaler	
Command Name		**Permission**	**Transparency**
Set:	**SHOW-OSD**	End User	Public
Get:	**SHOW-OSD?**	End User	Public
Description		**Syntax**	
Set:	Set the OSD display	# **SHOW-OSD**SP*P1*CR	
Get :	Get the OSD display	# **SHOW-OSD?**SP CR	
Response			
Set / Get : ~ nn@**SHOW-OSD**SP*P1*CR LF			
Parameters			
P1 – channel number *P2* - On/Off – See Section 5.1 On/Off			
Response Triggers			
Response is sent to the com port from which the Set (before execution) / Get command was received After execution, response is sent to all com ports if CMD-NAME was set any other external control device (button press, device menu and similar) or genlock status was changed			
Notes			
Displays the OSD of the selected Scaler			

Command - **W-ACTIVE**		Command Type - Multiviewer	
Command Name		**Permission**	**Transparency**
Set:	**W-ACTIVE**	End User	Public
Get	**W-ACTIVE?**	End User	Public
Description		**Syntax**	
Set:	Set active window	#**W-ACTIVE**SP*win_num*CR	
Get:	Get active window	#**W-ACTIVE?**CR	
Response			
~nn@ W-ACTIVESP *win_num*CR LF			
Parameters			
win_num - window number setting active			
Response Triggers			
After execution, response is sent to the com port from which the Set/Get was received After execution, response is sent to all com ports if W-ACTIVE was set by any other external control device (button press, device menu and similar)			
Notes			

Command - **W-BRD**		Command Type - Multiviewer	
Command Name		**Permission**	**Transparency**
Set:	**W-BRD**	End User	Public
Get	**W-BRD?**	End User	Public
Description		**Syntax**	
Set:	Set window border	#**W-BRD**SP*win_num, enable*CR	
Get:	Get window border status	#**W-BRD?**SP*win_num*CR	
Response			
~nn@**W-BRD**SP*win_num, enable*CR LF			
Parameters			
win_num - window number to enable/disable *enable* - On/Off - See Section 5.1 On/Off			
Response Triggers			
After execution, response is sent to the com port from which the Set/Get was received After execution, response is sent to all com ports if W-BRD was set by any other external control device (button press, device menu and similar)			
Notes			

Command - **W-COLOR**		Command Type - Multiviewer	
Command Name		**Permission**	**Transparency**
Set:	**W-COLOR**	End User	Public
Get	**W-COLOR?**	End User	Public
Description		**Syntax**	
Set:	Set window color intensity	#**W-COLOR**SP*win_num, value*CR	
Get:	Get window color intensity	#**W-COLOR?**SP*win_num*CR	
Response			
~nn@ **W-COLOR**SP*win_num, value*CR LF			
Parameters			
win_num - window number setting contrast *value* - color intensity value			
Response Triggers			
After execution, response is sent to the com port from which the Set/Get was received After execution, response is sent to all com ports if W-COLOR was set by any other external control device (button press, device menu and similar)			
Notes			
Value limits can vary for different devices Depending on used color space, device firmware might make a translation from *value* to RGB/ YCbCr… Value is a property of input connected to current window. Changing window input source might cause changes in this value (refer to device definitions)			

Command - **W-ENABLE**		Command Type - Multiviewer	
Command Name		**Permission**	**Transparency**
Set:	**W-ENABLE**	End User	Public
Get:	**W-ENABLE?**	End User	Public
Description		**Syntax**	
Set:	Set window visibility	#**W-ENABLE**SPwin_num,enable_flagCR	
Get:	Get window visibility status	#**W-ENABLE?**SP*win_num*CR	
Response			
~nn@ **W-ENABLE**SP*win_num, enable_flag*CR LF			
Parameters			
win_num - window number to enable/disable *enable_flag* - See Section 5.1 On/Off			
Response Triggers			
After execution, response is sent to the com port from which the Set/Get was received After execution, response is sent to all com ports if W-ENABLE was set by any other external control device (button press, device menu and similar)			
Notes			

Command - **W-FRZ**		Command Type - Multiviewer	
Command Name		**Permission**	**Transparency**
Set:	**W-FRZ**	End User	Public
Get	**W-FRZ?**	End User	Public
Description		**Syntax**	
Set:	Set freeze on selected window	#**W-FRZ**SP*win_num,freeze_flag*CR	
Get:	Get window freeze status	#**W-FRZ?**SP*win_num*CR	
Response			
~ nn@**W-FRZ**SP*win_num, freeze_flag*CR LF			
Parameters			
win_num - window number to enable/disable *freeze_flag* - see Section 5.1 On/Off			
Response Triggers			
After execution, response is sent to the com port from which the Set/Get was received After execution, response is sent to all com ports if W-FRZ was set by any other external control device (button press, device menu and similar)			
Notes			

Command - **W-HUE**		Command Type - Multiviewer	
Command Name		**Permission**	**Transparency**
Set:	**W-HUE**	End User	Public
Get	**W-HUE?**	End User	Public
Description		**Syntax**	
Set:	Set window hue value	#**W-HUE**SP*win_num, value*CR	
Get:	Get window hue value	#**W-HUE?**SP*win_num*CR	
Response			
~ nn@**W-HUE**SP*win_num, value*CR LF			
Parameters			
win_num - window number setting contrast *value* - hue value			
Response Triggers			
After execution, response is sent to the com port from which the Set/Get was received After execution, response is sent to all com ports if W-HUE was set by any other external control device (button press, device menu and similar)			
Notes			
Value limits can vary for different devices Value is a property of input connected to current window. Changing window input source might cause changes in this value (refer device definitions)			

Command - **W-LAYER**		Command Type - Multiviewer	
Command Name		**Permission**	**Transparency**
Set:	**W-LAYER**	End User	Public
Get	**W-LAYER?**	End User	Public
Description		**Syntax**	
Set 1:	Set window overlay order	#**W-LAYER**SP*win_num,value*CR	
Set 2:	Set all window overlay order	#**W-LAYER**SP*0xFF,value1,value2, …,valueN*CR	
Get 1:	Get window overlay order	#**W-LAYER?**SP*win_num*CR	
Get 2:	Get all window overlay order	#**W-LAYER?**SP*0xFF*CR	

Response

Set 1/Get 1: ~ nn@**W-LAYER**SP*win_num, value*CR LF

Set 2/Get 2: ~ nn@**W-LAYER**SP*0xFF,value1,value2,…valueN*CR LF

Parameters

win_num - window number setting layer
value - overlay order number

Response Triggers

After execution, response is sent to the com port from which the Set/Get was received

After execution, response is sent to all com ports if W-LAYER was set by any other external control device (button press, device menu and similar)

Notes

In case of overlays order list, number of expected layers is maximum number of windows in device

Command - **W-POS**		Command Type - Multiviewer	
Command Name		**Permission**	**Transparency**
Set:	**W-POS**	End User	Public
Get:	**W-POS?**	End User	Public
Description		**Syntax**	
Set:	Set window position	#**W-POS** SP *win_num,x0,y0,width,height* CR	
Get:	Get window position	#**W-POS?** SP *win_num* CR	
Response			
~ nn@**W-POS** SP *win_num,x0,y0,width,height* CR LF			
Parameters			
win_num - window number setting window position *x0,y0* - origin coordinate *width* - window width *height* - window height			
Response Triggers			
After execution, response is sent to the com port from which the Set/Get was received After execution, response is sent to all com ports if W-POS was set by any other external control device (button press, device menu and similar)			
Notes			

Command **–** **W-SHARP**		Command Type **-** Multiviewer	
Command Name		**Permission**	**Transparency**
Set :	**W-SHARP**	User	Public
Get:	**W-SHARP?**	User	Public
Description		**Syntax**	
Set:	Set window sharpness value	#**W-SHARP** SP *win_num,value* CR	
Get:	Get window sharpness value	#**W-SHARP?** SP *win_num* CR	
Response			
~ nn@**W-SHARP** SP *win_num,value* CR LF			
Parameters			
win_num - window number to set sharpness *value* - sharpness value			
Response Triggers			
After execution, response is sent to the com port from which the Set/Get was received After execution, response is sent to all com ports if W-POS was set by any other external control device (button press, device menu and similar)			
Notes			
Value limits can vary for different devices *Value* is a property of input connected to current window. Changing window input source might cause changes in this value (refer device definitions)			

Command – W-SRC		Command Type - Multiviewer	
Command Name		**Permission**	**Transparency**
Set :	**W-SRC**	User	Public
Get	**W-SRC?**	User	Public
Description		**Syntax**	
Set:	Set window source	#**W-SRC** SP *win_num,src* CR	
Get:	Get window source	#**W-SRC?** SP *win_num* CR	
Response			
~ nn @**W-SRC** SP *win_num,src* CR LF			
Parameters			
win_num - window number to set new source *src* – input source to connect to window (1… max input number)			
Response Triggers			
After execution, response is sent to the com port from which the Set/Get was received After execution, response is sent to all com ports if W-SRC was set by any other external control device (button press, device menu and similar)			
Notes			
src limits can vary for different devices			

Command - W-ZOOM		Command Type - Multiviewer	
Command Name		**Permission**	**Transparency**
Set:	**W-ZOOM**	End User	Public
Get	**W-ZOOM?**	End User	Public
Description		**Syntax**	
Set:	Set window zoom	#**W-ZOOM** SP *win_num,scale* CR	
Get:	Get window zoom	#**W-ZOOM?** SP *win_num* CR	
Response			
~ nn @**W-ZOOM** SP *win_num,scale* CR LF			
Parameters			
win_num - window number setting new source *scale* - zoom scale in percentage			
Response Triggers			
After execution, response is sent to the com port from which the Set/Get was received After execution, response is sent to all com ports if W-ZOOM was set by any other external control device (button press, device menu and similar)			
Notes			

3 Messages and Codes

3.1 Device Initiated Messages

Command	Syntax
Start message	~nn@Protocol Start CR LF
Switcher actions:	
Audio-video channel has switched (AFV mode)	~nn@**AV** SP *in>out* CR LF
Video channel has switched (breakaway mode)	~nn@**VID** SP *in>out* CR LF
Audio channel has switched (breakaway mode)	~nn@**AUD** SP *in>out* CR LF

3.2 Result and Error Codes

3.2.1 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

3.2.2 Error Codes

Error	Description
0	No error
1	Protocol syntax
2	Command not available
3	Parameter out of range
4	Unauthorized access
5	Internal FW error
6	Protocol busy
7	Wrong CRC
8	Timeout
9	(Reserved)
10	Not enough space for data (firmware, FPGA…)
11	Not enough space - file system
12	File does not exist
13	File can't be created
14	File can't open
15-20	(Reserved)
21	Packet CRC error
22	Packet number isn't expected (missing packet)
23	Packet size wrong
24-29	(Reserved)
30	EDID corrupted
31-39	Device specific errors

4 Packet Protocol Structure

The packet protocol is designed to transfer large amounts of data, such as files, IR commands, EDID data, etc.

4.1 Using the Packet Protocol

To use the packet protocol:

1. Send a command: LDRV, LOAD, IROUT, LDEDID
2. Receive Ready or ERR###
3. If Ready:
   - Send a packet
   - Receive OK on the last packet
   - Receive OK for the command
4. Packet structure:
   - Packet ID (1, 2, 3…) (2 bytes in length)
   - Length (data length + 2 for CRC) - (2 bytes in length)
   - Data (data length -2 bytes)
   - CRC - 2 bytes

01	02	03	04	05…	
Packet ID		Length		Data	CRC

5. Response:

~*NNNN*SP**OK**CR LF

Where *NNNN* is the received packet ID in ASCII hex digits.

4.2 Calculating the CRC

The polynomial for the 16-bit CRC is:

CRC-CCITT: 0x1021 = $x^{16} + x^{12} + x^5 + 1$

Initial value: 0000

Final XOR Value: 0

For a code example, see:

http://sanity-free.org/133/crc_16_ccitt_in_csharp.html

CRC example:

Data = “123456789”

Result => 0x31C3

5 Parameters

5.1 On/Off

Number	Value
0	Off
1	On

5.2 Stage

Number	Value
0	Input
1	Output
2	(Reserved)
3	(Reserved)

5.3 Signal Type

Number	Value
0	No signal
1	DVI
2	HDMI
3	DisplayPort
4	HDBaseT
5	SDI
6	VGA
7	Follow output
8	DGKat

5.4 Genlock Types

Number	Value
0	Free run
1	Digital
2	Analog

5.5 Video Resolutions

VIC Number	Resolution
0	No Signal (for input) / Native - EDID (for output)
1	640x480p @59.94Hz/60Hz
2	720x480p @59.94Hz/60Hz
3	720x480p @59.94Hz/60Hz
4	1280x720p @59.94Hz/60Hz
5	1920x1080i @59.94Hz/60Hz
6	720(1440)x480i @59.94Hz/60Hz
7	720(1440)x480i @59.94Hz/60Hz
8	720(1440)x240p @59.94Hz/60Hz
9	720(1440)x240p @59.94Hz/60Hz
10	2880x480i @59.94Hz/60Hz
11	2880x480i @59.94Hz/60Hz
12	2880x240p @59.94Hz/60Hz
13	2880x240p @59.94Hz/60Hz
14	1440x480p @59.94Hz/60Hz
15	1440x480p @59.94Hz/60Hz
16	1920x1080p @59.94Hz/60Hz
17	720x576p @50Hz
18	720x576p @50Hz
19	1280x720p @50Hz
20	1920x1080i @50Hz
21	720(1440)x576i @50Hz
22	720(1440)x576i @50Hz
23	720(1440)x288p @50Hz
24	720(1440)x288p @50Hz
25	2880x576i @50Hz
26	2880x576i @50Hz
27	2880x288p @50Hz
28	2880x288p @50Hz
29	1440x576p @50Hz
30	1440x576p @50Hz
31	1920x1080p @50Hz
32	1920x1080p @23.97Hz/24Hz
33	1920x1080p @25Hz
34	1920x1080p @29.97Hz/30Hz
35	2880x480p @59.94Hz/60Hz
36	2880x480p @59.94Hz/60Hz
37	2880x576p @50Hz
38	2880x576p @50Hz

VIC Number	Resolution
39	1920x1080i @50Hz
40	1920x1080i @100Hz
41	1280x720p @100Hz
42	720x576p @100Hz
43	720x576p @100Hz
44	720(1440)x576i @100Hz
45	720(1440)x576i @100Hz
46	1920x1080i @119.88/120Hz
47	1280x720p @119.88/120Hz
48	720x480p @119.88/120Hz
49	720x480p @119.88/120Hz
50	720(1440)x480i @119.88/120Hz
51	720(1440)x480i @119.88/120Hz
52	720x576p @200Hz
53	720x576p @200Hz
54	720(1440)x576i @200Hz
55	720(1440)x576i @200Hz
56	720x480p @239.76/240Hz
57	720x480p @239.76/240Hz
58	720(1440)x480i @239.76/240Hz
59	720(1440)x480i @239.76/240Hz
60	1280x720p @23.97Hz/24Hz
61	1280x720p @25Hz
62	1280x720p @29.97Hz/30Hz
63	1920x1080p @119.88/120Hz
64	1920x1080p @100Hz
65-100	(Reserved)
100	Custom resolution 1
101	Custom resolution 2
102	Custom resolution 3
103	Custom resolution 4
104	Custom resolution 5
104-254	(Reserved)

5.6 Color Space

Number	Value
0	RGB
1	YCbCr 4:2:2
2	YCbCr 4:4:4

5.7 Image Properties

Number	Value
0	Overscan
1	Full
2	Best fit
3	Panscan
4	Letterbox
5	Underscan 2
6	Underscan 1

5.8 View Modes

Number	Value
0	PIP off
1	PIP on
2	Preview

5.9 Custom Resolution Parameters

Number	Value
0	Width
1	Height
2	HTotal
3	VTotal
4	HSync width
5	HSync back porch
6	VSync width
7	VSync back porch
8	Frame rate
9	Interlaced (0)/Progressive (1)

5.10 Detail Timing Parameters

Number	Value
1	H-De-Start
2	H-De-Total
3	H-Total
4	V-De-Start
5	V-De-Total
6	Auto-DE-adjust

7	Auto-PHASE-adjust

5.11 Font Size

Number	Value
0	Small
1	Medium
2	Large

5.12 Layer Enumeration

Number	Value
1	Video
2	Audio
3	Data

5.13 Software Programmed

Number	Value
0	Do nothing
1	Step-in out 1
2	Step-in out 2
…	…
128	Step-in out 128
129	Echo to controller

5.14 EDID Source

Number	Value
0	Input
1	Output
2	Default EDID

5.15 Signal Validation

Number	Value
0	Signal or sink is not valid
1	Signal or sink is valid
2	Sink and EDID is valid

5.16 Ethernet Port Types

Number	Value
0	TCP
1	UDP

5.17 HDCP Types

Number	Value
0	HDCP Off
1	HDCP On
2	Follow input
3	Mirror output (“MAC mode”)

5.18 Parity Types

Number	Value
0	No
1	Odd
2	Even
3	Mark
4	Space

5.19 Serial Types

Number	Value
0	232
1	485

5.20 Audio Signal Types

Number	Value
0	No info
1	PCM
2	AC-3
3	MPEG1
4	MP3
5	MPEG2
6	AAC LC
7	DTS
8	ATRAC
9	DSD
10	E-AC-3
11	DTS-HD
12	MLP
13	DST
14	WMA Pro

5.21 Frequency Number

Number	Value
0	120
1	200
3	500
4	1200
5	3000
6	7500
8	12000

5.22 Audio Level

Number	Value
0	-10dB
20	0dB
40	+10dB

5.23 Audio Delay

Number	Value
0	Off
1	10ms
2	20ms
3	30ms
4	40ms
5	50ms
6	60ms
7	70ms
8	80ms
9	Auto

6 Command Index