TIPM Serial Commands Technical Reference Information

1   OVERVIEW

This document describes how to use ASCII text communications to control one or more of the following Christie projectors from a remote location:

- Roadie 25K/Roadie HD+30K/Roadie HD+35K
- Roadster (all)
- Mirage (all)
- Christie DS$^+$(all)
- Christie DW (all)
- Christie HD (all)
- Matrix 3000/4000/HD/S+/WU
- Cine-IPM 2K
- DLV1400-DX/DLV1920-DX
- TotalVIEW - RPMSP-DxxxU/RPMX-DxxxU

Although many ASCII commands in this document can also be used in some fashion with previous projector models, please refer to *Section 7* of the corresponding *Service Manual* for complete information regarding the use of ASCII in such projectors.

CONNECTION and USE: Once you have connected your computer to either the **RS232 IN** or **RS422 IN** port (depending on which standard is supported by your computer) or to the **ETHERNET** port on a projector listed above, you can remotely access projector controls and image setups, issue commands or queries, and receive replies. Use these bi-directional messages to:

- Download projector software upgrades using *KoRE 10-bit Librarian*
- Control multiple projectors
- Obtain a projector's status report
- Automate events on a projector or group of projectors
- Monitor sequences of events
- Diagnose performance problems

NOTES: 1) *Refer to the User's Manual provided with the projector for all cable requirements and other connection details.* **2)** *Some commands are operational only when projector is powered up.*

2   UNDERSTANDING MESSAGE FORMAT

All "remote control" information passes in and out of the projector as a simple text message consisting of a three letter command code and any related data. Opening and closing round brackets (parentheses) surround each message as shown below. Messages can be a command to *set* a projector parameter at a specific level, such as changing to a certain channel. Or the controller can *request* information, such as what channel is currently in use—the projector then returns the data in a *reply* message. Regardless of message type or origin, all messages use the same basic format and code as shown here.

	Message Format	Function	Examples
From Controller	(Code Data)	**SET** *(set channel to 24)*	(CHA 24) or (CHA24)
	(Code ?)	**REQUEST** *(what's current channel?)*	(CHA?)
From Projector	(Code ! Data)	**REPLY** *(channel is 24)*	(CHA!24)

Figure 1 The 3 Message Formats (SHADED MESSAGE IS FROM PROJECTOR)

Where applicable, a message may expand to include additional parameters of related details. And, if desired, you can choose to include optional information such as acknowledgements, checksums, and network addressing.

2.1   BASIC MESSAGE STRUCTURE

The following component fields comprise a standard ASCII message. Optional fields, such as extra characters for special modes, restrictions or added functionality, are shown in shaded areas.

__START__ **AND** __END__ **OF MESSAGE:** Every message begins with the left "**(**"character and ends with the right "**)**"character. Note that if the start character is received before an end character of the previous message, the partial (previous) message is discarded.

PREFIX CHARACTERS (OPTIONAL): For acknowledgement that the projector has responded, and/or to maximize message integrity, insert one or two special characters before the 3-character function code:

• **$ -** Acknowledgment. See 2.4 Maximizing Message Integrity, 2.4 Maximizing Message Integrity
• **& -** Checksum. See 2.4 Maximizing Message Integrity, 2.4 Maximizing Message Integrity

PROJECTOR NUMBERS (OPTIONAL): To control a selected projector or controller within a group, include its assigned number or address just before the three-character ASCII function code.

FUNCTION CODE: The projector function you wish to work with, such as channel selection or gamma, is represented by a three-character ASCII code (A-Z, upper or lower case). This function code appears immediately after the leading "**(**"that starts the message. In messages sent to the projector, a space between the function code and the first parameter (or special character) is optional.

REQUEST/REPLY SYMBOLS: If the controller is *requesting* information from the projector, a "**?**" question mark appears directly after the function code. If the projector is *replying*, a "**!**" exclamation mark appears directly after the function code. For *set* messages to the projector, neither of these characters appear—the code is followed by the data itself (see next).

OTHER SPECIAL FUNCTIONS (OPTIONAL): To add functionality to the current message, include one or more of the following special characters between the function code and first parameter. If more than one (M SP), add in any order.

- **A -** Auto Mode adjustment (rare—for video standard selection only). See 2.6 Other Special Functions, 2.6 Other Special Functions
- **E -** Enable Control Inquiry. See 2.6, Other Special Functions
- **G -** Global Control Inquiry. See 2.6, Other Special Functions
- **H -** Return the Help text for a control. See 2.6, Other Special Functions
- **I -** Used as an index for controls containing many values. See 2.6, Other Special Functions
- **K -** Keypad emulation. See 2.6 Other Special Functions, 2.6 Other Special Functions
- **L -** Return a list of options for 'list' controls. See2.6, Other Special Functions
- **M -** Find min/max adjustments (i.e., range). See 2.6 Other Special Functions, 2.6 Other Special Functions
- **N -** Return the name of the control. See 2.6, Other Special Functions
- **S -** Adjust a specific source setup only. See 2.6 Other Special Functions, 2.6 Other Special Functions
- **T -** Return the type of control (i.e. Slidebar etc.). See 2.6, Other Special Functions
- **P -** Adjust image in PIP window. See 2.6 Other Special Functions, 2.6 Other Special Functions

DATA: The value for a given projector state, such as "on" or "off", appears in ASCII-decimal format directly after the request/reply symbol. You can add an optional space after the symbol—i.e., before the data—in a *set* message, but data in *replies* follow the "!" symbol without a space. Other details to remember about data:

- All values returned by the projector (*reply* messages) have a fixed length of either 3 or 5 characters regardless of the actual value—the value is padded with leading zeros as necessary.
- Data in *set* messages to the projector does not require padding with zeros.
- For any given parameter, data is always the same number of characters. E.g., the **shutter** value, which is either "on" (1) or "off" (0) is always 3-digits: 001 or 000.
- Within each message, multiple parameters of data must be separated by one "**space**" character.
- Data pertaining to a source setup other than the current source setup is preceded by: the letter "S", the source setup number (i.e., channel), and a space. This is similar to an "extra" parameter P0.
- Text parameters such as channel names are enclosed in double quotes following the data, as in **"**Name**"**.

TEXT PARAMETERS: Most data is simply a numerical value, however some messages also require text. For example, a **channel naming** message typically includes a text-based name after the channel number—enclose this text in double quotation marks, as in **"**Tilt the Wagon**"**. Use all characters as desired *except* for the following special characters shown in the left column below—these require a 2-character combination as shown:

Table 1 Special Characters for Text

IF YOU WANT THIS…	ENTER THIS…	DESCRIPTION
\	\\	Backslash
"	\"	Quote
(	\(	Left bracket
)	\)	Right bracket
0x01	\b	Start of binary message (control code)
0x0A	\n	New line - if the text can be displayed on more than one line, this will set the line break.
0x1B	\x	control code (ESC)
0x0E	\e	End of binary message (control code)
0x11	\g	Xon (control code)
0x13	\s	Xoff (control code)

2.2 SAMPLE MESSAGES AND THEIR MEANING

DESIRED ACTION	MESSAGE	DESCRIPTION
Get current Chan#	(CHA?)	Request by controller for current channel #
Chan# reply from proj.	(CHA!24)	Reply from proj. that current channel is 24
Set Chan#	(CHA 24)	Switch to the first channel on the TPC
Get on-screen display status	(OSD?)	Request by controller for OSD state.
On-screen display is disabled.	(OSD!000)	Reply from proj. that menus are not displayed
Set on-screen display to ON	(OSD 1)	Turn the menu system on.

• For Single Projector
• For Broadcasting

Message Format	Function	Examples
(Code Data)	**SET** (set contrast to 64)	(con64)
(Code ?)	**REQUEST** (what's current contrast?)	(Con?)
(Code ! Data)	**REPLY** (contrast is 64)	(CON!064)
($ Code Data)	**SET AND ACKNOWLEDGE MESSAGE** (message processed?)	($con64)
(& Code Data ↓space Checksum)	**SET WITH CHECKSUM**	(&CON64 240)

• For Specific Projector Within a Network
• 1 Controller Present

Message Format	Function	Examples
(Dest. Addr. Code Data)	**SET** (turn proj.#5 on)	(5pwr1)
($ Dest. Addr. Code Data)	**SET AND ACKNOWLEDGE MESSAGE** (message processed?)	($5pwr1)

• For Specific Projector Within a Network
• Multiple Controllers Present

Message Format	Function	Examples
(Dest. Addr. ↓space Src. Code ?)	**REQUEST** (get contrast from proj. #5 to controller #2)	(5 2con?)
($ Dest. Addr. ↓space Src. Code Data)	**SET AND ACKNOWLEDGE MESSAGE** (is message from controller #2 processed by proj. #5?)	($5 2con?)
($ Dest. Addr. ↓space Src. Code Data)	**REPLY** (from proj. #5 to controller #2: contrast is 64)	(002 005CON!064)

2.3 WHAT IS ACTUALLY SENT IN A MESSAGE?

Although you will send and read messages as strings of ASCII characters, the actual message travels as a sequence of bytes. Each character in this sequence requires 1 byte. See example below, which illustrates a "lamp limit is 2000 hours" reply from the projector.
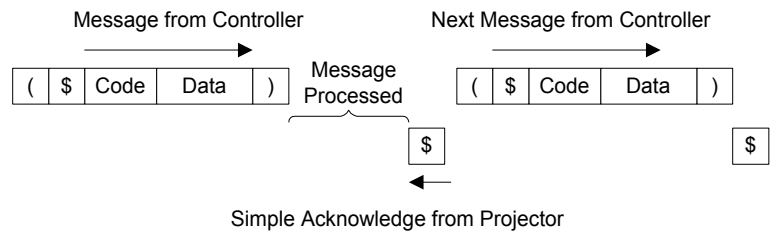
ASCII =	(	L	P	L	!	2	0	0	0	)
HEX =	0x28	0x4c	0x50	0x28	0x21	0x32	0x30	0x30	0x30	0x29

Figure 2 ASCII as Hex

2.4 MAXIMIZING MESSAGE INTEGRITY

For additional reassurance and/or maximum message integrity, you can insert one or two special characters:

ACKNOWLEDGMENTS: If you want assurance from the projector (or group of projectors) that a *set* message has been processed, request this simple acknowledgment by inserting a "**$**" just after the start code "**(**". When the projector executes the required action (such as a source switch, for example), the projector will send a "**$**"

(only) back. This is a quick way to confirm success with *set* messages, and is particularly useful with long-distance communication links or where the projectors and/or images are not visible from the controller. Acknowledgements can also be a type of flow control. Note that requesting an acknowledgement serves no purpose when included in a *request* message, since the acknowledgement will be redundant to the actual reply from the projector. However, if requested, the "**$**" acknowledgement from the projector will follow the reply.

CHECKSUMS: For maximum message integrity, add a checksum character "**&**" just after the "**(**"as shown below. You must then also include the correct checksum total (0-255) just before the "**)**" end code. Make sure to add a space before the calculated checksum to separate it from the last data parameter:

(&con64 240)

The checksum is the low byte of the sum of the ASCII values of all characters *between* the "**(**"and the beginning of the checksum. Calculate the checksum for the above "set contrast to 64" command as follows:

CHECKSUM EXAMPLE $= \& + c + o + n + 6 + 4 + $ 'space'

$= 26h + 63h + 6Fh + 6E\ h + 36h + \$34h + \$20h$

$= 01F0h$

$= F0h$ when only the low byte is used

$= 240$

The projector collects all of the message bytes as defined in the first byte of the message, then creates its own checksum value for comparison with the checksum included in the controller's message. If the values match, the message is considered to have been correctly received—otherwise the message is discarded.

NOTES: 1) *'h' indicates a hex number.* **2)** *If a "request" message has a checksum so will the reply.* **3)** *If using both "acknowledge" and "checksum", either character can occur first.*

2.5 ACCESSING SPECIFIC SOURCE SETUPS

For ASCII messages described in this document, it is assumed you are adjusting the current source setup (channel) rather than a different specific one. However, for several commands (for example, ASR, *Auto Source*) you can direct the message to particular source setup. To do this, insert an "**S**" and a source# (such as "S5") before the parameter value—the source setup number can be thought of as a "P0" parameter prior to the first parameter, and can be preceded with an optional space. For example:

    (ASR S25 1)   = Turn Auto-Source on for source setup #25

Use "S0" if your setting should be applied to all source setups (channels):

    (ASR S0 1)   = Turn Auto-Source on for all source setups

The "S" source setup function cannot be used for parameters affecting the projector as a whole such as projector address.

Other Examples:

(ASR 1)	= Turn ASR on for the current source setup
(ASR? S5)	= What is the ASR status for source setup #5?
(ASR!S005 001)	= ASR is on for source setup #5
(ASR? S7)	= What is the ASR status for source setup #7?
(ERR 006 "ASR: Source does not exist")	= Source setup #7 does not exist
(ASR?)	= What is the ASR status for current source setup?
(ASR!000)	= ASR is off for current source setup

2.6 OTHER SPECIAL FUNCTIONS

To add functionality to a message, include one or more of the following special characters directly after the start code "(". If you add more than one, they can be in any order.

PARAMETER LIMITS: For single-parameter projector function codes, you can find out the current range of adjustment by adding the letter "**M**" to your *request* message. For example:

(LPL?M)	What is the minimum and maximum lamp limit?
(LPL!M000 5000)	Minimum lamp limit = 0, maximum lamp limit = 5000.

Ranges cannot be determined in this manner if the function has multiple parameters. Note also that for text-based parameters, the "M" values represent the shortest and longest text strings possible.

"AUTO" MODE: For certain projector functions, you can add the letter "**A**" to your *set* message if you want software to choose the appropriate setting. A *reply* with an "**A**" indicates that the choice was auto-selected. For example:

(STD A)	Set the video standard to the most appropriate option.
(STD?)	What is the current video standard?
(STD!A4)	The video standard was automatically set to option 4 (such as PAL-M).

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Note that in these projectors, auto mode is supported *only* for selecting a video standard. Although other functions (such as Motion Filter) may offer an "Auto" choice in its list of options, a reply message from the projector will not include "A" to indicate that "Auto" it is selected—auto is simply an option chosen like any other.

ADJUSTING A PIP IMAGE: When there are two images on screen, all messages affect the primary image—that is, the larger "background" image. To direct a message to the PIP window instead, add the letter "**P**" to your set message. For example:

(CON P47)	In the PIP window, set contrast to 47.
(STD? P)	What is the current video standard used in the PIP window?

HELP TEXT: To have the Help Text for a specific command returned as a reply from the projector, add the letter "**H**" to your *request* message. For example:

(CON?H)	What is the help text for the Contrast Control?
(CON! "The Contrast is crushed"**)**	Reply from the projector.

GLOBAL INQUIRY: Add the letter "**G**" in your *request* message to find out if the control is global. A reply of "001" is returned if the control is global. For example:

(BDR?G)	Is BDR a global control?
(BDR!001)	BDR is a global control.

INDEX VALUE: When a control uses indexes for multiple values, insert an "I" into your request message to fin out the specific value of the index parameter. For example:

(BRU? I22)	What is the value for Brightness Uniformity specified by index 22?
(BRU! 123)	The value is 123 for index 22.

ACCESSING A LIST: For a control with a list of available options, add the letter "**L**" to your *request* message to get a reply of the available options in that list control in the order they appear in the menu. The reply message includes the following four parameters:

P1=1, item selectable

P2=1, item displayable

P3=value of item

P4=text for item

Examples:

(STD?L)	What are the list options for the STD list control?

(STD!L001 001 00008 "Auto")
(STD!L001 001 00007 "NTSC")
(STD!L001 001 00003 "NTSC4.43")
(STD!L001 001 00000 "PAL")
(STD!L001 001 00004 "PAL-M")
(STD!L001 001 00005 "PAL-C")
(STD!L001 001 00006 "PAL-60")
(STD!L001 001 00002 "SECAM")
(STD!L001 001 00009 "?")
(STD!L111 "—END—")

The end of the list is marked with P1=111. You can also access the text for a specific item in that list by adding the value of that item after the **L.** For example:

    (STD?L4)   What is the text for item for in the Video Standard list?

    (STD!L001 001 00004 "PAL-M")

CONTROL NAME: To find out the name of the control you are using, add the letter "**N**" to your *request* message. If the control uses indexes for multiple values, insert the index number after the "**N**" to read the name of the index. For example:

    (CON?N)   What is the name of the CON control?
    (CON! "Contrast")
    (BRU?N2)   What is the name for index parameter 2 for BRU?
    (BRU! "Left Side, R")
    (BRU?N6)   What is the name for index parameter 6 for BRU?
    (BRU! "Top Left Corner, R")

CONTROL TYPE: To find out the type of control it is that you are using, add the letter "**T**" to your *request* message. If indexes are being used for control with multiple values, insert the index parameter after the "**T**" to find out the type of control that the index is. For some slide bar or number controls, an additional parameter may be returned to specify the number of decimal places the control uses and if the control is to be displayed as a percentage (0=min and 100=max). If the *reply* message does not contain the letter "**T**", than this function is invalid for that control. The parameters for control types are:

    0 = Special Format
    1= Slide Bar
    2 = Checkbox
    3 = List
    4 = Number
    5 = Text
    6 = "Reserved Control"
    7 = Date
    8 = Time
    9 = IP (dotted quad)

Examples:

    (STD?T)   What type of control is STD?
    (STD! T003)   STD is a List.
    (CON?T)   What type of control is CON?
    (CON! T001%000)   CON is a slidebar that is currently at 0%.
    (EBB?T8)   What type of control is index parameter 8 of EBB?
    (EBB! T004 237)   EBB is a number control and it's current value is 237.

ENABLE INQUIRY: Add the letter "**E**" in your *request* message to find out if the control is enabled in the current context. A reply of "001" is returned if enabled. If the control has and index for multiple values, that index should be used to read the enable status.

(STD?E)	Is STD enabled in the current context?
(STE!E001)	STD is enabled.

KEYPAD EMULATION: Add the letter "**K**" in your *set* message to change to a quick "keypad mode" within the message. The next value in the message now represents the adjustment of the parameter.

K0 Stop the adjustment
K1 Toggle check box state
K2 Start decreasing a value, or moving the current image left/up
K3 Start increasing a value, or moving the image right/down

Examples:

(LHO K2)	Start moving the image left
(LHO K0)	Stop moving the image horizontally
(FRZ K1)	Freeze or unfreeze the image on the active window

Keypad emulation is required in APR, FCS, LHO, LVO and ZOM messages *set* messages.

2.7 FLOW CONTROL

Normally messages can be sent to the projector before processing of earlier messages is complete—the projector will just store messages in a buffer until ready to process. However, if a series of messages is sent it is possible that the projector may not be able to process them as fast as they arrive and the buffer will become full. If this happens, the projector will send the 13*h* (Xoff) code to instruct the controller (or any devices preparing to transmit) to cease transmission. At this point, the controller must respond immediately and send no more than 10 extra characters or they may be lost (i.e., the projector is able to accommodate the receipt of up to 10 more bytes after it sends 13*h* [Xoff]). When the buffer is once again available, the projector will send a 11*h* (Xon) command to resume transmission.
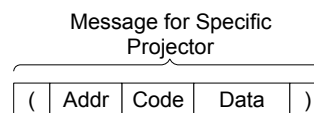
NOTE: *Xon and Xoff controls apply to both directions of communication. The projector will not send more than 3 characters after it has received a 13h (Xoff) code.*

FLOW CONTROL WITH "ACKNOWLEDGE": If the controller waits for each message to be acknowledged before sending the next and the controller does not send a message that is longer than 20 characters, then the projector will never send an Xoff and the controller does not have to handle them. If the projector has not received an Xon after receiving an Xoff code, after a time out it will assume that the Xon was lost and start transmitting again. If the controller has received an Xoff and no Xon within a reasonable time, it can assume that the Xon was lost. These two time outs are projector-specific and are in the range of 3s-60s.

2.8   NETWORK OPERATION

Up to 1000 projectors can be linked together in a chain with the 'OUT' port on one connected to the 'IN' port on the next. A controller connected to the 'IN' port on the first projector can control them all, either by broadcasting messages which have no address and are thus seen by all projectors, or by directing messages to specific projector addresses.
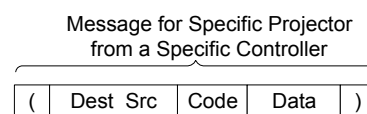
To work with a specific projector in a group, the projectors must first be assigned a unique I.D.—either a projector number or an Ethernet IP address. Insert the number of the target projector between the starting '**(**' and the 3-character ASCII code. See right →

Message for Specific Projector

(	Addr	Code	Data	)

Each projector compares the message address with its own address and, if matching, responds and processes the message. If the address does not match, the message is passed on until it reaches the intended projector.

Although messages without an address are always broadcast, you can also broadcast by including the reply destination address **65535**. This ensures that replies go to a specific controller address rather than being broadcast. The projector will also include its address in such as reply.

If you have more than one controller on a network, make sure to include both a source address and a destination address. With a single controller on the network, its address is never required. Place the source address between the destination address and 3-character code, including a space before and after as shown.

Message for Specific Projector from a Specific Controller

(	Dest Src	Code	Data	)

Note that replies from a projector do not contain an address unless the request message includes both a destination address and a source address—i.e., a reply to a request having only a destination address will not have any source address.

Examples:

DESIRED COMMAND	MESSAGE FROM CONTROLLER	REPLY FROM PROJECTOR
Turn Projector #5 on.	(5pwr1)	{none}
What is the contrast level in Projector 30?	(30con?)	(CON!127)
Return Contrast from Projector #30 to controller #2	(30 2con?)	(00002 00030con!127)

3   ASCII Codes

This section lists all ASCII message codes for controlling the projectors listed in _1 Overview_. To fully understand how an adjustment works or what it does in the projector and/or image, always consult the _User Manual_ provided with your projector.

General Notes to Remember:

• When a parameter for a specific _source setup_ is accessed (refer to _2.5 Accessing Specific Source Setups_) an "S" is inserted between the command code (space) and P1 (no space).

• The smallest increment for adjusting any parameter is always 1.

• For some controls (Contrast, e.g.), the value displayed on the screen is a _percentage_ while the actual hardware has a range of _0-255_. In these cases, remember that ASCII values are _correlations_ to the screen values, and will not match numerically (ASCII 0 = 0%, ASCII 128=50.2%, etc.).

SUMMARY LIST OF SERIAL COMMANDS

(ACE) Auto Color Enable	(BRU) Brightness Uniformity	(EBL) Edge Blending
(ACF) Accuframe	(BUS) Brightness Uniformity Select	(EBO) Edge Blending Overlap
(ADR) Projector Number	(CCA) Comprehensive Color Adjustment	(EBS) Edge Blending Select
(AGC) Automatic Gain Control	(CCC) Comprehensive Color Clear	(EME) Error Message Enable
(AIL) Auto Input Levels	(CCI) Color Temperature	(ERH) Error History
(ALC) Automatic Lens Calibration	(CCS) Select Output Color	(ERR) Error Message
(APJ) Active Projector	(CHA) Channel Select	(FAD) Fade Time
(APR) Optical Aperture	(CLE) Color Enable	(FCS) Focus
(APW) Auto Power Up	(CLP) Clamping	(FIL) Input Filter
(ARO) Aspect Ratio Overlay	(CLR) Color	(FIN) Floating Inputs
(ASR) Auto Source	(CON) Contrast	(FLE) Frame Lock Enable
(ASU) Auto Setup	(CRM) Chroma/Luma Delay	(FMT) Film Mode Threshold
(BBL) Bottom Blanking	(CSP) Color Space	(FRD) Frame Delay
(BDR) Baud Rate	(CWD) Color Wheel Delay	(FRZ) Freeze Image
(BDS) Baud Rates	(CWS) 2nd Color Wheel Delay	(FSE) Fan Sensor Enable
(BGC) Base Gamma Curve	(DEF) Factory Defaults	(FYI) For Your Information
(BKL) Backlight	(DLS) Delete Source	(GAM) Gamma
(BKY) Broadcast Keys	(DLY) Delay	(GIO) General Input/Output
(BLB) Blue BlackLevel	(DRK) Dark Interval	(GNB) Green BlackLevel
(BLD) Blue Drive	(DTA) Source Data	(GND) Green Drive
(BOG) Blue Odd Gain	(DTL) Detail	(GOG) Green Odd Gain
(BOO) Blue Odd Offset	(DTT) Detail Threshold	(GOO) Green Odd Offset
(BRM) Brightness Matching	(EBB) Edge Blending Black Levels	(HDC) DHDM Configuration
(BRT) Brightness	(EBE) Edge Blending Black Levels Select	(HDC) DHDM Configuration

(HDC) DHDM Configuration	(LPC) Lamp Changed	(PBW) PIP Border Width
(HIS) Lamp History	(LPH) Lamp Hours Of Use	(PDT) Peak Detector
(HLP) Help	(LPI) Lamp Intensity	(PHP) PIP Horizontal Position
(HOR) Horizontal Position	(LPL) Lamp Limit	(PHS) PIP Horizontal Size
(ILS) Intelligent Lens System	(LPM) Lamp Mode	(PIP) Picture In Picture
(INM) In Menu	(LPP) Lamp Power	(PJH) Projector Hours of Use
(IOP) Image Optimization	(LPS) Lamp Status	(PLK) Parameter Lockout
(ITG) Test Pattern Grey	(LPZ) Lamp Size	(PND) Plug & Display Modes
(ITP) Internal Test Pattern	(LST) Lamp Statistics	(PNG) Ping
(KEN) Keypad Enable	(MFT) Menu Font	(PPP) PIP Position Preset
(KEY) Key Code	(MLK) Source Memory Lock	(PPS) PIP Swap
(KST) Keystone	(MNU) Menu Status	(PRH) Projector Rental Hours
(LBL) Left Blanking	(MOT) Motion Filter	(PSW) Alternative Service Password
(LCB) Lens Calibrate	(MSH) Menu Shift Horizontal	(PVP) PIP Vertical Position
(LCN) Lens Center	(MSP) Menu Location	(PWE) Password Enable
(LCO) Lamp Conditioning	(MSV) Menu Shift Vertical	(PWR) Power
(LDM) Lens Direct Motion	(NAM) Source Channel Name	(PWU) Active Pixel WUXGA
(LDT) Level Detector	(NRD) Noise Reduction	(PXP) Pixel Phase
(LDV) Level Detector Value	(NSI) Number Select Image	(PXT) Pixel Tracking
(LHO) Lens Horizontal Offset	(NTR) Network Routing	(RBL) Right Blanking
(LLC) LiteLoc Calibration	(OSD) On Screen Display	(RDB) Red BlacKLevel
(LLM) LampLoc Module	(OTF) Output Format	(RDD) Red Drive
(LME) Lamp Message Enable	(OTR) Output Resolution	(REM) Remote Commands
(LNG) Language	(PAP) PIP Aspect Ratio Preset	(ROG) Red Odd Gain
(LOP) Lamp Operation	(PBC) PIP Border Color	(RTE) Real Time Events

(ROO) Red Odd Pixel Offset	(SZP) Size Presets Position	(VRT) Vertical Position
(SAV) Save Changes	(TBL) Top Blanking	(VST) Vertical Stretch
(SBE) Slidebar Enable	(TBL) Top Blanking	(WBT) White Boost
(SDE) Source Dialog Enable	(TDD) 3D Delay	(WFH) Warp Prefilter H
(SHU) Shutter	(TDI) 3D Stereo Sync Input	(WFV) Warp Prefilter V
(SIN) Select Input	(TDM) 3D Stereo Sync Mode	(WKC) 2D Keystone Corners
(SIZ) Size	(TDO) 3D Stereo Sync Output	(WPL) Warp Latency
(SOR) Screen Orientation	(TDS) 3D Stereo Sync Select	(WPS) Warp Select
(SPS) Splash Select	(TMD) Time/Date	(WSH) Warp Sharpness
(SRC) Select Source	(TNT) Tint	(XAR) XPort ArtNET Settings
(SST) System Status	(USR) User Message	(XIP) XPort IP
(STD) Video Standard	(VBL) Video Black Level	(ZOM) Zoom

DETAILED SERIAL COMMAND DESCRIPTIONS

(ACE) AUTO COLOR ENABLE	
DESCRIPTION Use to automatically project a specific color or colors when working with controls such as Input Levels, Odd Pixel Adjustment, and Color Saturation adjustments.	
PARAMETER <No Parameter>	**DESCRIPTION OF USE** Enable/Disable auto color controls.

(ACF) ACCUFRAME	
DESCRIPTION **NOTE:** **APPLIES TO MATRIX PROJECTORS ONLY!** This control is used to reduct motion artifacts in images with sparse content. When used it will also reduce image brightness and may increase image flicker, It should only be used when the motion artifacts are objectionable.	
PARAMETER <No Parameter>	**DESCRIPTION OF USE** Value Range varies with source image frame rate.

(ADR) PROJECTOR NUMBER	
DESCRIPTION Identifies or sets the projector's assigned number (0-999) so that it can be controlled separately within a grup of linked projectors. To change the Ethernet IP address via ASCII, refer to (XIP) Export IP.	
PARAMETER <No Parameter>	**DESCRIPTION OF USE** Valid Address range is 0 to 999.

(AGC) AUTOMATIC GAIN CONTROL	
DESCRIPTION Enable/disable the Automatic Gain Control. This control allows the decoder to automatically track the sync amplitude of the incoming signal.	
PARAMETER <No Parameter>	**DESCRIPTION OF USE**

(AIL) AUTO INPUT LEVELS	
DESCRIPTION If enabled, this control allows the projector to continuously monitor the input signal levels of the analog inputs and make adjustments as needed. Whenever the projector detects a level that would lead to the crushing of black or white levels, it adjusts the input offset or gain to compensate. If the input signal is not being crushed, the projector will do nothing.	
PARAMETER <No Parameter>	**DESCRIPTION OF USE** Perform auto input level on the main image.

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(ALC) AUTOMATIC LENS CALIBRATION

DESCRIPTION

Automatic Lens Calibrationis used in conjunction with the Intelligent Lens Systems, refer to (ILS) Intelligent Lens System to determine if a power on lens calibration should be initiated (see LCB). If ILS is turned on, and ALC is also on, a lens calibration cycle will begin each time the projector is powered on. If ILS is on, but ALC is off, the system will assume that the lens position has not been changed and reset the lens reference point to the value it had when it was last turned off.

Having ALC on ensures an accurate reference point for the lens positioning system, while having if off saves the time and disruption implicit in a power on calibration cycle. ALC defaults to on, however it will retain the user setting across power cycles, so it remains in the state the user sets it to.

If ILS is activated, and if motion calibration has not been completed, calibration will proceed on a power up regardless of the ALC setting. Please refer to the LBC lens calibration command for details.

Currently ILS is only active on the zoom and focus adjustments for Christie Projectors and automatic lens calibration only applies to these as well.

PARAMETER	DESCRIPTION OF USE
<No Parameter>	0 = Off, 1 = On

(APJ) ACTIVE PROJECTOR

DESCRIPTION

Use APJ to temporarily disable (0) or enable (1) the IR and wired keypad inputs to a specific projector in a network of projectors. APJ is essentially the same as using the (PROJ) key, and is best understood as a way of changing a projector's listening status even though ⏻ and (PROJ) still work. NOTES: **1)** APJ does not affect the built-in keypad. **2)** An APJ to disable the keypad does not change the state of the *Communications* menu checkboxes for Front IR, Rear IR, Wired keypad—these will remain checked (on). **3)** The keypads revert to "enabled" after a power-down, or if the projector is unplugged and plugged in again.

PARAMETER	DESCRIPTION OF USE
<No Parameter>	0 = Disable, 1 = Enable

(APR) OPTICAL APERTURE

DESCRIPTION

To adjust the optical aperture size from 0 to 9. Raided to improve contrast, lower to improve brightness.
NOTE: *The DS+60 and Matriz 3000 (single-chip projectors) require keypad emulation for serial adjustment of the optical aperture.*

PARAMETER	DESCRIPTION OF USE
<No Parameter>	Range 0 to 9

EXAMPLES:
(APR K2) - Start increasing the aperture size (higher brightness)
(APR K3) - Start decreasing the aperture size (higher contrast)
(APR K0) - Stop changing the aperture size
NOTE: *To "nudge" the aperture size, script in a delay between (APR K3) and (APR K0). Depending on your application, a delay of at least 20-30 milliseconds may be sufficient.*

(APW) AUTO POWER UP

DESCRIPTION
Set to automatically power up (1) or remain off (0) after a power failure.

PARAMETER	DESCRIPTION OF USE
<No Parameter>	0 = Disable, 1 = Enable

(ARO) ASPECT RATIO OVERLAY

DESCRIPTION
Enables or disables Aspect Ratio layer over Image layer.

PARAMETER	DESCRIPTION OF USE
<No Parameter>	0 = Off, 1 = On

EXAMPLES:
(ARO 1) - Turn on Aspect Ratio Overlay.
(ARO 0) - Turn off Aspect Ratio Overlay.

(ASR) AUTO SOURCE

DESCRIPTION
Automatically select a particular source setup (P1=S1-50) when switching channels. Enable (P2=1) or disable (P2=0) this function as desired. Refer to Accessing Specific Source Setups. **NOTE:** *In an ASR reply, On/Off state is P3 and the availability of the source setup is P2.*

PARAMETER	DESCRIPTION OF USE
"SET" **P1**	Setup #1, identifies which source setup to use (xx=channel number from 01 to 50).
P2	**On / Off** 0 = auto source is Off 1 = auto source is On
"REPLY" **P1**	Setup #1, identifies which source setup to use (xx=channel number from 01 to 50).
P2	**Availability** 0 = OK 1 = this setup does not exist (not defined)
P3	**On / Off** 0 = auto source is Off or does not exist 1 = auto source is On

(ASU) AUTO SETUP

DESCRIPTION
This control tells the projector to automatically adjust as many parameters as it can to produce the optimal setup for the current input.

PARAMETER	DESCRIPTION OF USE
<No Parameter>	Perform a standard auto setup on the main video.

EXAMPLE:
(ASU) - Perform standard auto setup on main video.

(BBL) BOTTOM BLANKING

DESCRIPTION
Set the number of lines to blank (turn to black) at the bottom of the image. This can be used to blank out any unwanted data near the bottom edge of the image.

PARAMETER	DESCRIPTION OF USE
<No Parameter>	Set the bottom blanking for slot x, input y.

(BDR) BAUD RATE

DESCRIPTION
Set the baud rate for a serial communications port. For RS232 IN and RS232 OUT, the default is 115200. For RS422, the default is 19200. The default communications settings for all ports is 8 data bits, no parity. Valid baud rates, with the values to select them, are:
0 = 1200
1 = 2400
2 = 9600
3 = 19200
4 = 38400
5 = 57600
6 = 115200
NOTE: *Wait at least 2s before sending the first message at the new rate. A reply returns a 7-digit value; the complate number, plus leading zeros, refer to examples. An Invalid setting will trigger an error message.*

PARAMETER	DESCRIPTION OF USE
PRTA	Set the baud rate on port A (RS232 IN).
PRTB	Set the baud rate on port B (RS232 OUT).
PRTC	Set the baud rate on port C (RS422).

EXAMPLES:
(BDR96) - Set the RS232 baud rate to 9600.
(BDR?) - What is the current RS232 baud rate?
(BDR!0019200) - The current RS232 baud rate is 19200.

(BDS) BAUD RATES

DESCRIPTION

Set the baud rate for a serial communications port. For RS232 IN and RS232 OUT, the default is 115200. For RS422, the default is 19200. The default communications settings for all ports is 8 data bits, no parity. Valid baud rates, with the values to select them, are:

0 = 1200
1 = 2400
2 = 9600
3 = 19200
4 = 38400
5 = 57600
6 = 115200

NOTE: *Wait at least 2s before sending the first message at the new rate. A reply returns a 7-digit value; the com-plate number, plus leading zeros, refer to examples. An Invalid setting will trigger an error message.*

PARAMETER	DESCRIPTION OF USE
<No Parameter>	Set the base gamma curve for slot x, input y.

EXAMPLES:
(BDS38400) - Set the RS422 baud rate to 38400.
(BDS!0115200) - The current RS422 baud rate is 115200.

(BGC) BASE GAMMA CURVE

DESCRIPTION

Select the base gamma curve. "0" represents the default 2.2 curve, 1-21 are user defined <u>Arbituary Gamma Curves</u>. **NOTE:** *Curves 1 - 21 are not supported in v 1.0.*

PARAMETER	DESCRIPTION OF USE
<No Parameter>	Set the base gamma curve for slot x, input y.

(BKL) BACKLIGHT

DESCRIPTION

Turn the built-in keypad backlighting Off (0) or On (1).

PARAMETER	DESCRIPTION OF USE
<No Parameter>	0 = Off, 1 = On

EXAMPLES:
(BKL 1) - Turn On built-in keypad backlighting.
(BKL 0) - Turn Off built-in keypad backlighting.

(BKY) BROADCAST KEYS

DESCRIPTION

Toggle Broadcast Key Mode to select whether all key presses received by the projector will be relayed to all other projectors on the network.

PARAMETER	DESCRIPTION OF USE
<No Parameter>	Set to 1 to enable.

(BKY) Broadcast Keys con't

EXAMPLES:
(BKY 1) - Enable Broadcast Key.
(BKY 0) - Disable Broadcast Key.

(BLB) BLUE BLACKLEVEL

DESCRIPTION

Set or request the blue *Blacklevel* (0-511) for a specific source setup.

PARAMETER	DESCRIPTION OF USE
<No Parameter>	Range 0 to 511

(BLD) BLUE DRIVE

CONTROL GROUP: Input   **SUBCLASS:** Power Up   **ACCESS LEVEL:** Operator

DESCRIPTION

Set or request the blue *Drive* (0-511) for a specific source setup.

PARAMETER	DESCRIPTION OF USE
<No Parameter>	Range 0 to 511

(BOG) BLUE ODD GAIN

DESCRIPTION

Set or request the blue Odd Gain (0-255) for a specific source setup. You can set an Odd Gain value for two separate analog input paths. The first input path is Input 1 (BNC connectors). The second input path is one of: Input 2 (DVI-A connector), or Input 5 or Input 6 (lne of the analog option cards).

To leave one of the input values unaffected, enter a value of 0 for the input. If only one value is specified, then both input paths will have the same value.

PARAMETER	DESCRIPTION OF USE
<No Parameter>	Range 0 to 255

EXAMPLES:
(BOG 130 135) - Sets the BNC analog path to 130, the DVI/option card path to 135.
(BOG 0 120) - Leaves the BNC path as it was, the DVI/option card path to 120.
(BOG 125) - Sets both paths to 125.

(BOO) BLUE ODD OFFSET

DESCRIPTION

Set or request the blue Odd Offset (0-255) for a specified source setup. You can set an Odd Offset value for two separate analog input paths. The first input path is Input 1 (BNC connectors). The second input path is one of: Input 2 (DVI-A connector), or Input 5 or Input 6 (lne of the analog option cards).

To leave one of the input values unaffected, enter a value of 0 for the input. If only one value is specified, then both input paths will have the same value.

PARAMETER	DESCRIPTION OF USE
<No Parameter>	Range 0-255

(BRM) BRIGHTNESS MATCHING

CONTROL GROUP: Option   **SUBCLASS:** Power Up   **ACCESS LEVEL:** Operator

DESCRIPTION
This control assists with matching the brightness among a wall of projectors. It becomes important if 1 new lamp is installed in a wall and is much brighter than most other lamps because lamps have aged a while.
If lamp power adjustment does not provide the necessary range, adjust this control a little lower to match the brightness. After this adjustment, Primary Color adjustment is performed next.
Value does not go below 10% which is 25 because it would suggest a projector failure. Value of 85% or above is a practical range for color matching

PARAMETER	DESCRIPTION OF USE
<No Parameter>	Range 25 to 255

(BRT) BRIGHTNESS

DESCRIPTION
The Brightness control adjusts the offset applied to the input signal. It has exactly the same effect as adjusting the input levels, except that it operates an all 3 colors and can be used to make quick adjustments. Set the image brightness from 0-1000. The BRT value represents a percentage, e.g. 1000=100.0% or 0505=50.5%.

PARAMETER	DESCRIPTION OF USE
<No Parameter>	Set the brightness from 0 to 1000. Value represents a percentage, e.g. 1000 = 100.0% or 0505 = 50.5%.

EXAMPLE:
(BRT 500) - Set brightness to 500 on main video.

(BRU) BRIGHTNESS UNIFORMITY

DESCRIPTION
Use BRU to adjust light output in the 8 zones around the central zone in the inmage, and/or to turn BRU On/Off. To find out if BRU is On, send a request with no parameters. The reply will be "Off" (0) or "On" (1).

PARAMETER	DESCRIPTION OF USE
P1	Where to adjust? or (if Christie TWIST and no other parameters) 0 = Overall 5 = Top Left 1 = Left 6 = Top Right 2 = Right 7 = Bottom Left 3 = Top 8 = Bottom Right 4 = Bottom

P1	Which type of Brightness Uniformity?
	If Christie TWIST and no P2 or P3 parameters,
	P1= 0 = Disable
	    1 = Enable normal Christie Brightness Uniformity
	    2 - 4 = User-defined brightness uniformity (requires s/w v1.1 or higher)

(BRU) Brightness Uniformity con't	
P2	Which color to adjust. 0 or R = Red 1 or G = Green 2 or B = Blue
P3	Setting 0 - 255 for "Overall" 0 - 127 for all other zones
P1	Uniformity Enable flag P1 = 0 = Disable 1 = Enable, Set, or Clear Uniformity Feature Enale Flag NOTE: The feature will not be 'in use' unless the feature is available.
Read Brightness Uniformity	P1 = Which adjustment? Which zone of brightness uniformity to return. P2 = Which color? Which zone of brightness uniformity to return.
Brightness Uniformity Message	P1 = Which adjustment? Which zone of brightness uniformity to return. P2 = Which color? Which zone of brightness uniformity to return. P3 = The value of the specified adjustment.
Brightness Uniformity By Index	P1 = I Specifies which indexed value to read.
Brightness Uniformity By Index Message	P1 = The value of the specified adjustment.
Brightness Uniformity Text By Index	P1 = N Specifies which indexed text to return.
Brightness Uniformity Text By Index Message	P1 = text The text for the specified adjustment.

EXAMPLES:

 (BRU 2 0 65) - set right red zone to 65 (41 hex).

(BRU 5 G 24) - set top left green zone to 24.

(bru? 0 B) - request overall brightness of blue

(bru! 0 B 039) - reply overall brightness of blue is 39.

(BRU 1) - enable Brightness Uniformity feature if feature available.

(bru?) - request Uniformity Enable checkbox status

(bru! 1) - Brightness Uniformity is Enabled.

(bru? I33) - Return the value specified by index 33

(bru i33 24) - Set the value of the parameter referenced by index 33, to 24

(bru?n33) - Return the menu text for indexed parameter 33

(BUS) BRIGHTNESS UNIFORMITY SELECT

DESCRIPTION
Enables/Disables brightness uniformity. If a TWIST module is installed the control changes to a list and allows several different uniformity maps to be selected.

PARAMETER	DESCRIPTION OF USE
<No Parameter>	Enable/Disable

EXAMPLES:
(BUS 1) - Set to enable (without TWIST).
(BUS 0) - Set to disable (without TWIST).
(BUS?L) - Read the current list.

(CCA) COMPREHENSIVE COLOR ADJUSTMENT

DESCRIPTION
Use the CCA service function to change the factory-set native colors (*Max Drives*) in the projector, or to define one or more custom color palettes (i.e., color gamut). CCA changes x/y coordinates for red, green, blue and white points (and, in *Roadie 25K* only, magenta, cyan and yellow) for a given gamut. Can be applied with CCS command.
NOTE: *Remember that Max Drives represents the measured native colors of the projector, and that all color performance depends on these native colors. A new CCA for Max Drives will change **all** color performance and gamut (palettes).*

PARAMETER	DESCRIPTION OF USE
P1	Which gamut (palette) to adjust. 0 = This is a duplicate of 1 (Max Drives) 1 = Max Drives5 = User 1 2 = Color Temperature]]6 = User 2 3 = SD Video]7 = User 3 4 = SD Video]8= User 4]NOTE: Factory-set to industry standards. Adjustment is not recommended as it will change this performance standard.]]Affects only the current color temperature settig. Color Temp coordinates with CCA is not recommended.
P2	Red x
P3	Red y
P4	Green x
P5	Green y
P6	Blue x
P7	Blue y
P8	White x
P9	White y
P10	Magenta x
P11	Magenta y

(CCA) Comprehensive Color Adjustment con't	
P12	Cyan x
P13	Cyan y
P14	Yellow x
P15	Yellow y
EXAMPLES: (CCA?) - What is the current color adjustment? (CCA 1 661 341 332 575 144 93 320 330) - Set "Max Drives" to these x/y coordinates.	

(CCC) COMPREHENSIVE COLOR CLEAR

DESCRIPTION

The CCC command will copy the data from one of the comprehensive color setups into the currently selected user setup (USER1-4). Refer to CCS for a list of possible selections.

PARAMETER <No Parameter>	**DESCRIPTION OF USE**

(CCI) COLOR TEMPERATURE

DESCRIPTION

Use CCI to implement a color temperature from 3200K-9300K. This control changes just the white point (x/y) of the current gamut, and is applied only if you are using color temperature (CCS) as your "Select Color Adjustment" choice.

PARAMETER <No Parameter>	**DESCRIPTION OF USE**

(CCS) SELECT OUTPUT COLOR

DESCRIPTION

Use CCS to select a predefined or user-defined color palette for use with a given source.

PARAMETER <No Parameter>	**DESCRIPTION OF USE** Values: 0 = Max Drives (default) 1 = Color Temperature 2 = SD Video 3 = HD Video 4 = User 1 5 = User 2 6 = User 3 7 = User 4

(CHA) CHANNEL SELECT

DESCRIPTION
Select the channel to use, in the range 1-50. Make a copy of a channel, and assign it a unique number (optionally, specify a new channel number). Same as *(SRC) Select Source*.

PARAMETER	DESCRIPTION OF USE
<No Parameter>	Range 1 to 50

EXAMPLES:
(CHA?) - Get current active channel.
(CHA 10) - Set main to channel 10.

(CLE) COLOR ENABLE

DESCRIPTION
Enable a specific color to be projected on the screen.

PARAMETER	DESCRIPTION OF USE
<No Parameter>	Values: 1 = Red 2 = Green 3 = Blue 4 = Yellow 5 = Cyan 6 = Magenta 7 = White 8 = Black **NOTE:** *Colors will alwys revert to white (full color) upon power-up and if "Exit" at presentation level.*

(CLP) CLAMPING

DESCRIPTION
Use to define the blacklevel clamping location for the current signal.

PARAMETER	DESCRIPTION OF USE
<No Parameter>	0 = Sync Tip, 1 = Back Porch, 2 = Tri-level

(CLR) COLOR

DESCRIPTION
Set the color intensity (1-1000) for video images. The value represents a percentage, e.g. 1000 = 100.0% or 0505 = 50.5%.

PARAMETER	DESCRIPTION OF USE
<No Parameter>	Range 0 to 1000

(CON) CONTRAST

DESCRIPTION
This control sets the image contrast level (0 - 1000). The value represents a percentage, e.g. 1000 = 100.0% or 0505 = 50.5%.

PARAMETER	DESCRIPTION OF USE
<No Parameter>	Range 0 to 1000

(CRM) CHROMA/LUMA DELAY

DESCRIPTION
Chroma/Luma delay adjusts the time delay between the chroma and the luminance signals in decoded signals. Set the time delay (20 - 50) between the chroma and luminance in decoded signals.

PARAMETER	DESCRIPTION OF USE
<No Parameter>	Range 20 to 50

(CSP) COLOR SPACE

CONTROL GROUP: Input   **SUBCLASS:** Power Up   **ACCESS LEVEL:** Operator

DESCRIPTION
This control specifies which color space the input signal uses. This determines how the color components are decoded for accurate color in the display. Color space control only applies to analog input signals. Although the proper color space is normally determined automatically by the projector, you can override the setting. Use RGB unless you are using component video. Use YPbPr(SDTV) for most video sources. Use YPbPr(HDTV) for high definition signals.
NOTE: When certain RGB signals are first connected, the projector may not initially recognize them as RGB and may incorrectly decode their color information as YPbPr(SDTV). These signals can include: RGB signals in NTSC, PAL, SECAM frequency ranges, Scan-doubled sync-on-green, Scan-quadrupled sync-on-green. For these signals, change the Color Space to RGB, then define a new channel for future use.

PARAMETER	DESCRIPTION OF USE
<No Parameter>	Values: 0 = RGB 1 = YPbPr (SDTV) 2 = YPbPr (HDTV)

EXAMPLE:
(CSP 1) - Set color space to YPbPr(SDTV).

(CWD) COLOR WHEEL DELAY

DESCRIPTION
For *DS+60* and *Matrix 3000* (single-chip projectors) only. Upon installation of a new primary color wheel, use CWD as a calibration to adjust the delay of the color wheel relative to the index mark on the wheel. This ensures all levels of intensity will have the correct color.

PARAMETER	DESCRIPTION OF USE
<No Parameter>	Range 0 to 1000

EXAMPLE:
(CWD 500) - Set the delay of the color wheel to 500.

(CWS) 2ND COLOR WHEEL DELAY

DESCRIPTION
For *DS+60* and *Matrix 3000* (single-chip projectors) only. Upon installation of a new secondary color wheel, use CWS as a calibration to adjust the delay of the second color wheel relative to the index mark on the wheel. This ensures all levels of intensity will have the correct color.

PARAMETER	DESCRIPTION OF USE
<No Parameter>	Range 0 to 1000

EXAMPLE:
(CWS 500) - Set the delay of the second color wheel to 500.

(DEF) FACTORY DEFAULTS

DESCRIPTION
Use DEF to reset all parameters in the projector to factory defaults—all source setups are deleted, all factory-defined color palettes are restored, and all user adjustments/preferences are set to default values. DEF may also change your baud rate and projector number.
NOTE: *You must include P1 = 111 in any DEF message. This requirement prevents accidental use of DEF.*
Because the DEF message can take a fairly long time, it is a good idea to include the optional *Acknowledge* code ($) to determine when the defaults have been completed—i.e., ($def 111).

PARAMETER	DESCRIPTION OF USE
<No Parameter>	

(DLS) DELETE SOURCE

DESCRIPTION
Delete a specific locked or unlocked source setup (1-50), or to delete all unlocked source setups (0). To delete ***all*** setups, even those that are locked, you must first unlock all source setups using the memory lock command (MLK S0 0).

PARAMETER	DESCRIPTION OF USE
<No Parameter>	

(DLY) DELAY

DESCRIPTION
To delay a real-time event for a number of milliseconds (1-65535ms).

PARAMETER	DESCRIPTION OF USE
<No Parameter>	

EXAMPLE:
(RTE G 5 H "(DLY 100) (PWR 0)") - When pin 5 goes high, delay 100ms, then power Off.

(DRK) DARK INTERVAL

DESCRIPTION

Control the time interval—in active output lines—between frames projected to the screen, so that active 3D applications are well-synchronized with shutters in 3D glasses. Range depends on source frequency. For 3D models only.

PARAMETER	DESCRIPTION OF USE
<No Parameter>	

(DTA) SOURCE DATA

DESCRIPTION

Use DTA to read from the projector (or load into the projector) all of the settings related to a specific source setup (1-50), or pertaining to system parameters. This essentially creates a back-up. If a source setup does not exist, use DTA to define all settings for it. This essentially creates a back-up.

Keep in mind that a DTA request triggers reply messages for each setting in a source setup. Because of the large number of replies, requesting an acknowledgement from the projector ($) is a good idea—receiving the ($) back confirms that the projector has returned all data and completed the full DTA reply.

For reading settings (data) for all souce setup, use P1=0 ($DTA?S0). The reply will be a sequence of replies for each source. If you requested an achnowledgement ($), it will arrive after the last reply for the last source, refer to the example below.

For downloading source setup settings (data) to a projector, send a DTA message. This will define a new source setup, and include the specified parameters (ferer back to the "Reading Setting for a Specific Source Setup". See below for an example.

Settings for projector preferences are either Transferable or Projector-specific, refer to reading prefernce settings example below.

To download preference settings to a projector, just send the various settings as separate commands—DTA is not used. Take special care when sending BDR (Baud Rate) and ADR (Projector # or Address) messages, as they change the way your network operates and you may accidentally break communication. For example, BDR should always be broadcast to all projectors or you will be unable to talk to some projectors.

PARAMETER	DESCRIPTION OF USE
P1	The number of the source setup to read - must have leading 'S': For example, ($DTA? S5) If P1 = source # 1-50, this identifies a specific source setup to read P1 = the number of the source setup being read (1-50)
P2	Switch number (0 = projector)
P3	Slot number
P4	The vertical frequency (cHz)
P5	The horizontal frequency (10's of Hz)

(DTA) Source Data con't	
P6	Input polarity & routing Bits 2 - 0//horizontal sync source 0 = no sync 1 = horizontal on vertical input 2 = horizontal on horizontal input 3 = horizontal on green input 4 = horizontal on red input 5 = horizontal from Vid1 input 6 = horizontal from Vid2 input Bit 3// set if composite sync (H & V on same wire) Bit 4//set if horizontal sync has negative polarity Bit 5//set if vertical sync has negative polarity
Setting 1	Reply message for second source setup setting
Setting 2	Reply message for third source setup setting
Setting n	Reply message for last source setup setting
$	Acknowledge of DTA message (if requested)
T	Transferable: Valid for any projector of the same model. Single DTA parameter.
P	Projector-specific: Unique to an individual projector. Single DTA parameter.

EXAMPLES:
($DTA? S5)
(DTA! S005 000 001 05996 03150 059)
(CON! S005 045)
(BRT! S005 167)
Etc...
($)

READING SETTINGS (DATA) FOR ALL SOURCE SETUP
($DAT?S0) - Request all settings for ALL sources.
      NOTE: *If you request an acknowledgement* ($), *it will arrive after the last reply for the last source.*
(DTA! S005 000 001 05996 03150 059)setup
(CON! S005 045)
(BRT! S005 167)
Etc...
(DTA! S034 000 001 05996 03150 059)
(CON! S034 022)
(BRT! S034 137)
Etc...
$

(DTA) Source Data con't

EXAMPLES:
DOWNLOADING SOURCE SETUP SETTINGS (DATA) TO A PROJECTOR
(DTA! S005 000 001 05996 03150 085)
(CON! S005 045)
(BRT! S005 167)
Etc...
(DTA! S034 000 001 05996 03150 085)
(CON! S034 022)
(BRT! S034 137)
Etc...
READING PREFERENCE SETTINGS
($DTA? **T**) - Set to request all preferences that can be used in other projector of the same model
(BRD! 09600)
(LPI! 00345)
Etc...
$
($DTA? **P**) - Set for preferences that are unique to an individual projector
(CTM! 001 002 00000 000 01187)
(CTM! 002 007 05400 012 043)
Etc...
$

(DTL) DETAIL

DESCRIPTION
To set the detail for RGB and video images.

PARAMETER	DESCRIPTION OF USE
<No Parameter>	Set the detail for slot x, input y.

(DTT) DETAIL THRESHOLD

DESCRIPTION
Detail threshold selects a filter sensitivity to noise. A higher value may improve noisy sources especially for higher settings of detail.
This control sets the minimum change required before the detail (DTL) function is activated. This allows images to be sharpened without increasing the background noise.

PARAMETER	DESCRIPTION OF USE
<No Parameter>	Set the detail threshold for slot x, input y.

EXAMPLE:
(DTT 50) - Set the detail threshold to mid point.

(EBB) EDGE BLENDING BLACK LEVELS

DESCRIPTION
The EBB control is only active when Edge Blending (EBS) and Black Level Blending (EBE) have been enabled. The particular edges that have been blended with the Edge Blending (EBL) command will be active for blending the black levels. For example, you cannot adjust the Edge Blend Black level for the top edge, if there is no edge blending active for the top edge. Similar to the EBL control, data can be specified by zones or edges, or by index.

CHRISTIE®

(EBB) Edge Blending Black Levels con't	
PARAMETER **P1**	**DESCRIPTION OF USE** Value: 1 - 16 1 - 9 = blend edge/zone width 10 - 13 = edge zone width 14 - 16 = color components of overall black level 1 = Center 2 = Top 3 = Bottom 4 = Left 5 = Right 6 = Top Left 7 = Top Right 8 = Bottom Left 9 = Bottom Right 10 = Left Width 11 = Right Width 12 = Top Width 13 = Bottom Width 14 - Black Red Level 15 = Black Green Level 16 = Black Blue Level
P2	When P1 = 1-9, P2 = 0-247 When P1 = 10-13, P2 = 0-255 When P1 = 14-16, P2 = 0-255 Brightness (0 - 247) Zone Width (0 - 255) Color Level (0 - 255)
EXAMPLES: (EBB 2 15) - Set brightness to top edge to 15. (EBB?) - Request state of Black Level Blending. (EBB! 1) - Black Level Blending is enabled.	

(EBE) EDGE BLENDING BLACK LEVELS SELECT

DESCRIPTION

This command enables (1) or disables (0) the black level blending feature. This feature can only be enabled when Edge Blending has been enabled (EBS).

PARAMETER <No Parameter>	**DESCRIPTION OF USE** Enable/Disable
EXAMPLES: (EBE 1) - Enable black level blending. (EBE 0) - Disable black level blending. (EBE?) - Get current black level blending state.	

(EBL) EDGE BLENDING

DESCRIPTION

NOTE: *In v1.0 software, Edge Blending can only be enabled or disabled-use the menus for specific blend settings.*
Use EBL to blend together the overlapping edges of adjacent images, and/or to turn EBL on/off. To find out if EBL is on, send a request with no parameters. The reply will be "off" (0) or "on" (1). **NOTE:** *The on-screen values do not match values through ASCII messaging.*

PARAMETER	DESCRIPTION OF USE
P1	**Which blend edge? or** **(if Christie TWIST and no other parameters).** **Type of edge blending to use.** 0 = Left 1 = Right 2 = Top 3 = Bottom Or, if Christie TWIST and no P2 or P3 parameters, P1 = 0 = Disable 1 = Enable normal Christie Edge Blending 2 - 4 = User-defined custom blend (requires s/w v 1.1 or higher)
P2	**Which blend charateristics?** 0 = Width of blend 1 = Shape of blend 2 = Midpoint of blend
P3	**Setting** Left/Right Width = 0, 5-80 Top/Bottom Width = 5-60 Shape = 2-30 Midpoint = 2-30

EXAMPLES:
(EBL 2 0 15) -Set width of top blend to 15.
(EBL?) - What is the current status of Edge Blending? On or Off?
(EBL! 1) - Edge Blending is currently enabled.

(EBO) EDGE BLENDING OVERLAP

DESCRIPTION

Use EBO in conjunction with Edge Blending to simplify the aligning of edge-blended projectors. Enabling EBO (1) sets the blend region to a uniform gain of 25% and the rest of the image to 100%. Disable EBO (0) to restore previous gain settings.

PARAMETER	DESCRIPTION OF USE
<No Parameter>	Enable/Disable

EXAMPLES:
(EOB 1) - Enable edge blending overlap.
(EOB 0) - Disable edge blending overlap.

(EBS) EDGE BLENDING SELECT

DESCRIPTION

This enables (1) or disables (0) edge blending. If a Twist module is installed the control changes to a list and allows several different edge blends to be selected. Use the (EBS?L) request to read the list.

PARAMETER	DESCRIPTION OF USE
<No Parameter>	Enable/Disable

EXAMPLES:

(EBS 1) - Enable edge blending overlap.
(EBS 0) - Disable edge blending overlap.
(EBS?L) - Request to read the list.

(EME) ERROR MESSAGE ENABLE

DESCRIPTION

This control enables the displaying of error messages, and determines to which interface the messages are sent. Error messages can be turned off or can be displayed on the screen, sent out the serial port, or both. This setting does not affect messages for invalid user entries, for which error messages are always displayed.

PARAMETER	DESCRIPTION OF USE
<No Parameter>	Values: 0 = Off
	1 = On-Screen display
	2 = ASCII message (i.e., via ERR messages)
	3 = Both
	4 = All except error 1E & F (3D Sync Errors)

EXAMPLES:

(EME ?) Get current Error Message Enable state.
(EME 1) Direct error messages to the screen.

(ERH) ERROR HISTORY

DESCRIPTION

This enables the logged errors to be read one at a time or as a dump. The Errors logged will have an associated date and time stamp which corresponds to when the error was logged. The error messages that will be logged are only those that are categorized as system errors or system warnings.

The value 0 is defined as the last error, 1 the second last and so on. If an empty set is returned (i.e. ERH ""), then the end of the error history has been reached.

PARAMETER	DESCRIPTION OF USE
<No Parameter>	

EXAMPLES:

(ERH? 0) ERH "BDR:Invalid parameter 1 08/09/98 12:30:00PM")
(ERH?) All of the error history.

(ERR) ERROR MESSAGE

DESCRIPTION
The projector broadcasts an ERR message when an error is detected. Each ERR message includes the error code (P1), error type (P2), and a text explanation. Error messages also include the address of the source projector.
NOTE: *The type of error and the text explanation are enclosed together in quotation marks, separated by a colon and a space. Below, the text explanation appears as -----.*

PARAMETER		DESCRIPTION OF USE
see below		see below
ERROR CODE (P1)	**TYPE OF ERROR (P2)**	**MEANING**
001	"System Error: ----"	System crash.
002	"System Warning: ----"	System error.
003	"Invalid parameter:----"	Invalid parameter number.
004	"Too many parameters:---"	Message requires fewer parameters.
005	"Too few Parameters:----"	Message requires more parameters.
006	"Source does not exist:----"	The source setup # is wrong.
007	"Could not be executed:"	Current content prevented the command from executing.
008	"Checksum error:----"	The checksum is incorrect.
009	"Unknown request:----"	Message code undefined. If the message sent as a command it is ignored and no error is returned.
010	"Communication error:---"	System crash.
011	"RX Break	System crash.
012	Supplementary info	

EXAMPLES:
NOTE: *The 65535 signifies the port address of the controller receiving the message.*
(65535 00030ERR 001 "System Error: SYNC no longer responding") - SYNC no longer responding
 (65535 00030ERR 002 "System Warning: The current source cannot be deleted") - Attempt to delete the current souce
(BDR38900) - (65535 00030ERR 003 "BDR: Invalid parameter 1")
(BLB 25 25)- (65535 00030ERR 004 "BLB: Too many parameters")
(ASR S10)- (65535 00030ERR 005 "ASR: Too few parameters")
(ASR S10 1)- (65535 00030ERR 006 "AST: Source does not exist")
(CON 45 with no source)- (65535 00030ERR 007 "CON: Could not be executed")
(&con 64 250)- (65535 00030ERR 008 "CON: Checksum Error")
(ABC?)- (65535 00030ERR 009 "ABC: Unknown request")

(FAD) FADE TIME

DESCRIPTION
Controls the amount of time it takes to fade between images on a source switch (0 = seamless, 100 = 1 second). Time in hundreths of a second to allow the fade.

PARAMETER	DESCRIPTION OF USE
<No Parameter>	Range 0 to 150; where 150 = 1.5 seconds, 1 = 10ms, 0 = off

(FAD) Fade Time con't

EXAMPLE:
(FAD 100) - Fade for 1 second.

(FCS) FOCUS

DESCRIPTION
Adjust the lens focus offset to a specific position.To "nudge" the focus a minimum abount, script in a delay between (FCS K3) and (FCS K0). Depending on your applicaion, a delay of at least 20-30 milliseconds may be sufficient.
Non-ILS Projectors - The value is not stored. Key emulation is used to change the settings (refer to the Key Emulation Section of this document). See examples below.
ILS Projectors - The value is stored for each saved channel, however the key emulation continues to be supported as described above. A channel value can be changed by the following command:

Modifier	Parameter 1	Parameter 2	Description
S	**P1** = channel number	**P2** = position (0-9999)	Set source to balue and move if currently active
M	**P1** = channel number	Not used	Return min/max values for control
	P1 = postion	Not used	Move current channel to this position

Entering a position will also cause movement to that position when ILS is turned On.
NOTE: *This command will take some time to complete. Repeated commands must allow sufficient time for the previous movement to complete; hence it is not suitable for frequent or continuous lens positioning using ILS. Refer to the **LDM** command for this functionality.*

PARAMETER	DESCRIPTION OF USE
<No Parameter>	Move the focus motor to a specified position. The default data range is -1200 to 1200. **NOTE:** *The range may change after running the Lens Calibration function, which determines the full range allowed by the hardware.*

EXAMPLES: NON-ILS PROJECTORS
(FCS K0) - Stop Zoom Movement, Lens will not stop until this command is issued or the end stop is reached.
(FCS K2)   +ve Focus direction.
(FCS K2)   -ve Focus direction.
EXAMPLES: ILS PROJECTORS
(FCS S1 4000) - Set focus for source 1 to 4000 and if channel 1 is active channel, move to this position.
(FCS? S1) - Return the position for channel 1: (FCS! 0001 04000)
(FCS? M1) - Return min max values for channel 1: (FCS? 00000 09999)
(FCS 4000) - Set focus of current channel to 4000 and move to this position

(FIL) INPUT FILTER

DESCRIPTION
Use FIL to force an internal filter. This automatic filter is for analog sources only. Valid values are:
0 = Off
1 = HDTV
2 = SDTV
3 = EDTV
4 = Graphics/RGB

PARAMETER	DESCRIPTION OF USE
<No Parameter>	Set the filter for slot x, input y.

(FIL) Input Filter con't

EXAMPLES:
(FIL 2) - Set the filter to HDTV.

(FIN) FLOATING INPUTS

DESCRIPTION
This control enables or disables floating inputs on a TIPM -09 (001-100093-04).

PARAMETER	DESCRIPTION OF USE
<No Parameter>	Enable/Disable

EXAMPLE:
(FIN 1) - Enable floating inputs.
(FIN 0) - Disable floating inputs.
(FIN?) - Request to read the list.

(FLE) FRAME LOCK ENABLE

DESCRIPTION
To define how the projector controls the output frame timing based on the input signal. Use the following parameters to achieve the desired output frame timing.

PARAMETER	DESCRIPTION OF USE
P1	0 = Rate Matched – the output runs at close to the input frequency but is not locked to it so the output will drift in phase relative to the output. 1 = Locked – if possible the output image is phase locked to the input frames 2 = Free Run – the output runs at 60Hz frame rate **NOTE:** For older versions of software (v1.1 and earlier) this control is a checkbox to enable a "Locked" output. When unchecked the output is "Frame Matched".

(FMT) FILM MODE THRESHOLD

DESCRIPTION
Use FMT to adjust the threshold (0-255) at which the projector will consider an incoming video signal as *film* vs. *video*.

PARAMETER	DESCRIPTION OF USE
<No Parameter>	Range 0 to 255

(FRD) FRAME DELAY

DESCRIPTION

Delays the output signal timing relative to the input signal timing by a fraction of a frame, and up to several frames.

PARAMETER	DESCRIPTION OF USE
<No Parameter>	Set the amount of delay.

(FRZ) FREEZE IMAGE

DESCRIPTION

Freeze the display image. This allows a detailed examination of a single frame of an otherwise moving image. Switching channels/inputs automatically switches the projector to unfrozen.

PARAMETER	DESCRIPTION OF USE
<No Parameter>	1 = Freeze, 0 = Unfreeze

(FSE) FAN SENSOR ENABLE

DESCRIPTION

Use FSE if you want the projector to shut down 3 minutes after a critical cooling fan failure. **NOTE:** *Definition of a which cooling fan is critical varies with projector model.*

PARAMETER	DESCRIPTION OF USE
<No Parameter>	

EXAMPLES:
(FSE 1) - Enable fan sensor
(FSE 0) - Disable fan sensor

(FYI) FOR YOUR INFORMATION

DESCRIPTION

The projector broadcasts an FYI message when it detects a change in status. The FYI message contains the relevant status code followed by its new state (P1), up to 2 additional parameters of detail, and a brief text description. The address of the source projector precedes the FYI code.
NOTE: *FYI messages are gated by the Error Message Enable (EME) control. Turning off EME also turns off FYI.*

PARAMETER	DESCRIPTION OF USE
see (FYI) For Your Information con't.	see (FYI) For Your Information con't.

(FYI) For Your Information con't		
STATUS CODE	**NEW STATE (P1)**	**MEANING AND ADDITIONAL PARAMETERS**
001 Power	0 = Off 1 = On 2 = Boot 10 = Cool Down 11 = Warm Up	P1 value indicates the new "Power" state detected.
002 Proj. Address	##### (5-digit address)	P1 value indicates the new address of this source projector.
003 Proj. Selected	0 = RS232 Inactive, UI Inactive 1 = RS232 Inactive, UI Active 2 = RS232 Active, UI Inactive 3 = RS232 Active, UI Active	This projector has been activated or inactivated via the PROJ key or the APJ serial message.
004 Baud Rate	####### (7-digit baud rate)	P1 value indicates the new baud rate.
005 Standby	0 = Off 1 = On	P1 value indicates whether the system is in standby mode
006 Signal	0 = Good Signal 1 = Signal missing 2 = bad sync	P1 describes signal detection P2 = hor. frequency of signal P3 = vert. frequency of signal
007 OSD	0 = Off 1 = On	P1 value indicates whether the on-screen display is on or not.
009 Shutter	0 = Open 1 = Closed	P1 value indicates whether the shutter is open or closed.
010 Input	0 = Open 1 = Closed	P1 describes the current channel number P2 = Switcher# (projector is always switcher "000") P3 = Slot#
011 Picture Mute.	0 = Off 1 = On	P1 value indicates whether the picture is displayed or not
012 PIP.	0 = Off 1 = On	P1 value indicates whether Picture-in-Picture mode is on or not
255 General / Misc.	### (3-digit channel number)	P1 describes miscellaneous general state detected

(FYI) For Your Information con't

EXAMPLES:
(00030FYI 001 000 "POWERED OFF")
(00030FYI 002 00057 "PROJECTOR ADDRESS CHANGED FROM 30 TO 57")
(00057FYI 003 001 "PROJECTOR UI ACTIVE, RS-232 INACTIVE")
(00057FYI 004 38400 "BAUD RATE CHANGED TO 38400")
(00057FYI 006 000 01573 05994 "GOOD SIGNAL")
(00057FYI 006 002 "BAD SYNC: HSYNC IS TOO HIGH")
(00057FYI 007 000 "OSD OFF")
(00057FYI 009 001 "SHUTTER CLOSED")
(00057FYI 010 034 000 003 "SWITCHED TO CHANNEL 34, PROJECTOR INPUT 03")
(00057FYI 010 035 000 004 "Switched to channel 35, projector input 04")

(GAM) GAMMA

DESCRIPTION
Use GAM to set a 3-digit gamma level interpolated between a base curve (2.2 by default, or an arbitrary gamma curve, selected via the BGM *Base Gamma* control), a high curve (3.0), and a linear curve.

PARAMETER	DESCRIPTION OF USE
<No Parameter>	Range is 100 to 280 (=1.8-2.0)

(GIO) GENERAL INPUT/OUTPUT

DESCRIPTION
Use GIO to configure and control the General Purpose Input and Output (GPIO) bits. There are 7 GIO pins available on the 9pin DIN GPIO connector, plus power and ground.

PARAMETER	DESCRIPTION OF USE
<No Parameter>	Set the Direction for the individual pins to inputs or outputs.

GPIO PINS	
Connector Pin #	Signal
1	+12V (200mA)
2	GPIO 1
3	GPIO 2
4	GPIO 3
5	Ground
6	GPIO 4

General Message format:

(GIO?)// Request state and configuration of all pins
(GIO? C#)// Read configuration for specific pin
(GIO C# <Input/Output>)// Set pin # configuration to <Input = I, Output = O>
(GIO C# "List of configurations")// Set multiple pin configurations starting at pin <#> i.e. <"IOxO">
(GIO # <state>)// Set pin <#> to <state> H= High, L= Low
(GIO # "List of states")// Set multiple pin states, starting at pin <#> i.e. <"HLxL">
(GIO # P <Duration in ms>)// Pulse pin <#> for <n> milliseconds

Where   C = configure
              # = desired pin number or start pin number
              x = no change

NOTES: 1) *When a command is issued to a pin configured as an input, the command triggers the same functions as if the input pin actually changed state.* **2)** *The GIO configuration and state take time to save to the projector. Leave your projector running for several after your setup is complete.* **3)** *GPIO numbers start from 1 not zero.*

(GIO) General Input/Output con't

EXAMPLES:
Set the Direction
(GIO?) // Request state and configuration of all pins
(GIO! "HLLLLHL" "IOOOOII") // Reply of pin state and configuration
(GIO "HLLLLHL" "IOOOOII") // Set Pin state and configuration. The above commands can be used to save and restore Preference information
(GIO C1 O) // Set Pin 1 as output
(GIO? C1) // Get Configuration for pin 1
(GIO!C1 O) // Reply for get pin configuration
(GIO C2 "OOIO") // Set pin 2=out, 3=out, 4=in, 5=out
(GIO 1 H) // If configured as output, set to high
         // If configured as input, perform task equivalent to the input going high
(GIO 1 "HLLL") // Assuming config as outputs 1=high, 2,3,4=low
(GIO 1 P 100) // Pulse pin 1 for 100mS

(GNB) GREEN BLACKLEVEL

DESCRIPTION
Set or request the green *Blacklevel* (0-511) for a specific source setup.

PARAMETER	DESCRIPTION OF USE
<No Parameter>	Range 0 to 511

EXAMPLE:
(GNB 128) - Set green black level to 128.

(GND) GREEN DRIVE

DESCRIPTION
The green drive level is used to compensate for different amounts of attenuation between the Red, Green and Blue in the signal.Set or request the green *Drive* (0-511) for a specific source setup.

PARAMETER	DESCRIPTION OF USE
<No Parameter>	Range 0 to 511

EXAMPLES:
(GND 128) - Set green drive to 128.

(GOG) GREEN ODD GAIN

DESCRIPTION
Set or request the green *Odd Gain* (0-255) for a specific source setup. You can set an Odd Gain value for two separate analog input paths. The first input path is Input 1 (BNC connectors). The second input path is one of: Input 2 (DVI-A connector), or Input 5 or Input 6 (one of the analog option cards).
To leave one of the input values unaffected, enter a value of 0 for the input. If only one value is specified, then both input paths will have the same value.

PARAMETER	DESCRIPTION OF USE
<No Parameter>	Range 0 to 255

(GOG) Green Odd Gain con't

EXAMPLES:
(GOG 130 135) - Sets the BNC analog path to 130, the DVI/option card path to 135.
(GOG 0 120) - Leaves the BNC path as it was, the DVI/option card path to 120.
(GOG 125) - Sets both paths to 125.

(GOO) GREEN ODD OFFSET

DESCRIPTION
Set or request the green *Odd Offset* (0-255) for a specific source setup. You can set an Odd Offset value for two separate analog input paths. The first input path is Input 1 (BNC connectors). The second input path is one of: Input 2 (DVI-A connector), or Input 5 or Input 6 (one of the analog option cards).
To leave one of the input values unaffected, enter a value of 0 for the input. If only one value is specified, then both input paths will have the same value.

PARAMETER	DESCRIPTION OF USE
<No Parameter>	Range 0 to 255

(HDC) DHDM CONFIGURATION

DESCRIPTION
When the Dual SD/HD-SDI module is present, the HDC command specifies how the card is being used. The module can be used to support a Dual Link setup or have two independent single HD channels. By default the configuration is set to two single channels. You may select a dual link setup where the 'A' channel on the module is the primary video channel or the selection can be made to have the 'B' channel as the primary video in a dual link format. P1 is the Option Slot number (1 or 2) and P2 is the value you want to set for the configuration (as shown below).

PARAMETER	DESCRIPTION OF USE
P1 = Option slot number (1 or 2) **P2** = Value to set for the configuration	**P1 - P2** 0 - Automatic Detection 1 - Two Single HD Channels 2 - 4:4:4 RGB Dual Link, Channel A Primary 3 - 4:4:4 RGB Dual Link, Channel B Primary 4 - 4:4:4 YCbCr Dual Link, Channel A Primary 5 - 4:4:4 YCbCr Dual Link, Channel B Primary 6 - 4:2:2 YCbCr Dual Link, Channel A Primary 7 - 4:2:2 YCbCr Dual Link, Channel B Primary

EXAMPLES:
(HDC 2 3) - Set configuration on Option slot 2 to be: 4:4:4 RGB Dual Link, Channel B Primary
(HDL? 2) - Request configuration for slot 2 only; returns (HDC! 002 003) for above setting.
(HDL?) - Request configuration for either slot; returns (HDC! 001 000) (HDC! 002 003) if cards exist in both slots.

(HDL) DHDM LOOP THRU SETTING

DESCRIPTION

When the Dual SD/HD-SDI module is present, a serial input may be routed to a serial output to allow chaining of signal sources using the HDL command. You can specify which input is routed to which output. Primary and Secondary sources may also be used as designated inputs to loop to outputs. P1 defines the option card slot you wish to configure and P2 refers to what loop thru inputs and outputs are desired. The table below lists the value options.

PARAMETER P1 = Option card slot P2 = Loop through inputs and outputs	DESCRIPTION OF USE		
	P1 = Value	**P2= Input**	**Output**
	0	A	C
		B	D
	1	A	D
		B	C
	2	Primary	C
		Secondary	D
	3	Primary	D
		Secondary	C

EXAMPLES:

(HDC 2 3) - Set loop thru on option slot 2 to be: Primary thru to D and Secondary thru to C.

(HDL? 2) - Request loop thru for slot 2 only; returns (HDL! 002 003) for above setting.

(HDL?) - Request loop thru for either slot; returns (HDL! 001 001) (HDL! 002 003) if cards exist in both slots.

(HIS) LAMP HISTORY

DESCRIPTION

Use the read-only HIS request to obtain the projector's lamp history. Note for dual-lamp, this information is stored separately for each lamp (P1 identifies Lamp 1 or 2).

PARAMETER P1 = Lamp 1 or 2	DESCRIPTION OF USE See examples below

EXAMPLES:

(HIS? 1) - What is the Lamp 1 history?

(HIS! 001 001 00555 "000000014")   // Lamp 1, sn.="000000014", first lamp used, on for 555 hours

(HIS! 001 002 00095 "000000018")   // Lamp 1, sn.="000000018", second lamp used, on for 95 hours

(HIS?) - What is the complete lamp history for Lamp 1 and Lamp 2?

(HIS! 001 001 00555 "000000014")   // Lamp 1, sn.="000000014", first lamp used, on for 555 hours

(HIS! 001 002 00095 "000000018")   // Lamp 1, sn.="000000018", second lamp used, on for 95 hours

(HIS! 002 001 00666 "000000022")   // Lamp 2, sn.="000000022", first lamp used, on for 666 hours

![Christie logo]

(HLP) HELP

DESCRIPTION

Use HLP for a list of all serial commands supported in your projector—send the (HLP?) request. Each item in the list has 3 parameters stating if the command is disabled (and why), its 3-character code, and the menu label or brief description:

PARAMETER	DESCRIPTION OF USE
P1	Current On/Off state of the command 0 = enabled 1 = disabled because power is off 2 = disabled because the required hardware is missing 3 = disabled because the function has not been licensed 4 = disabled because the factory option has not been enabled 5 = disabled because the command is not valid in the current context 6 = disabled because the user has an insufficient security level 7 = disabled because the function has been locked in the service menu 8 = this is a read-only function
P2	3-letter ASCII code for the command (ASR, BRU, etc.)
P3	Menu lable for the command. For those commands for which there is no equivalent menu item, short descriptive text is returned.

EXAMPLES:
(HLP?) - Retrieve entire command help listing.

(HOR) HORIZONTAL POSITION

DESCRIPTION

Move the horizontal position of the image left or right.

PARAMETER	DESCRIPTION OF USE
<No Parameter>	Set the horizontal position for the main image.

EXAMPLES:
(HOR 500) - Set horizontal position to 500 on main video.

(ILS) INTELLIGENT LENS SYSTEM

DESCRIPTION

This enables (1) the lens settings to be saved / restored when the channel is changed. When off (0), changing the channel does not affect the lens settings. When ILS is activated it may cause a query to proceed with lens motor calibration (see LCB). Lens calibration is necessary for ILS to function. Since calibration will take a couple of minutes, the user is allowed to decline and leave ILS turned off.

If calibration has already been completed, it may be skipped by switching OFF the Automatic Lens Calibration (ALC). Refer to ALC for details on this operation.

PARAMETER	DESCRIPTION OF USE
<No Parameter>	Enable/Disable

EXAMPLES:
(ILS 1) Enable ILS.
(ILS 0) Disable ILS.

(INM) IN MENU

DESCRIPTION
Use INM to specify whether a source setup is to be included in (1) or excluded from (0) the source setup selection menu. Refer to *2.5 Accessing Specific Source Setups*.

PARAMETER	DESCRIPTION OF USE
<No Parameter>	Toggle In Menu for channel (xx=channel number from 01 to 99).

EXAMPLES:
(INM?) - Get channel in-menu state for channel.

(IOP) IMAGE OPTIMIZATION

DESCRIPTION
With the IOP control, the user can choose whether raw image quality or the cleanness of image transitions is more important.
Choosing Best Image Quality allows scalar resources to be allocated under some conditions to improve image quality in the form of deeper pixel depth. However, when switching sources, the screen will go blank and increase your switching time.
Choosing Smooth Switching allows for cleaner transitions and/or fading when a user selects a new source to be displayed. The images will fade from the old image to the new image according to the Fade Time control (FAD). Seamless Switching overrides the Frame Lock Enable (FLE) settings and forces the output to run at 60Hz regardless of the input signal. The image is 100% seamless when switching sources.

PARAMETER	DESCRIPTION OF USE
P1	0 = Best Image Quality 1 = Smooth Switching 2 = Seamless Switching **NOTES: 1)** *These settings have no effect on the Roadie 25K. It does not support seamless switching (which includes Fade Time). There will be dark time between switches.* **2)** *IOP and PIP use the same resources and therefore cannot be used at the same time.*

(ITG) TEST PATTERN GREY

DESCRIPTION
Use ITG to set the grey level for the flat field internal test pattern. The range of adjustment depends on the bit depth available in your projector model.

PARAMETER	DESCRIPTION OF USE
<No Parameter>	

(ITP) INTERNAL TEST PATTERN

DESCRIPTION

Use ITP to display an internal test pattern, or to find out what test pattern is currently displayed. The basic test pattern collection is shown listed below—your projector may vary slightly. See pattern number and description below.

PARAMETER	DESCRIPTION OF USE
<No Parameter>	0 = User image - no test pattern displayed
	1 = Grid + grey scale + color bars + circle + convergence marks
	2 = Grey Scale 16
	3 = White
	4 = Grey - slide bar selects value 0-1023
	5 = Black
	6 = Checker
	7 = 13 Point
	8 = Color Bars
	9 = RGBW Grey Scale
	10 = Multi Color
	11 = Edge Blend
	12 = Aspect Ratio
	13 = Red & Blue Ramp
	14 = Calibration Line Pattern
	15 = Calibration Black and White Grid
	16 = Calibration White and Red Grid
	17 = Calibration White and Green Grid
	18 = Calibration White and Blue Grid

(KEN) KEYPAD ENABLE

DESCRIPTION

Use KEN to set the keypad input protocols, Wired, IR Front and IR Rear, to respond to the protocol of the desired keypad. The following table outlines how to use the command parameters to set the desired protocols.
NOTE: *The built-in keypad cannot be disabled.*
NOTE: *Protocols B – G are used with the 'Brick' style rental staging keypad-Standard IR Remote.*

PARAMETER	DESCRIPTION OF USE
P1	0 = Wired
	1 = IR Front
	2 = IR Rear

(KEN) Keypad Enable con't

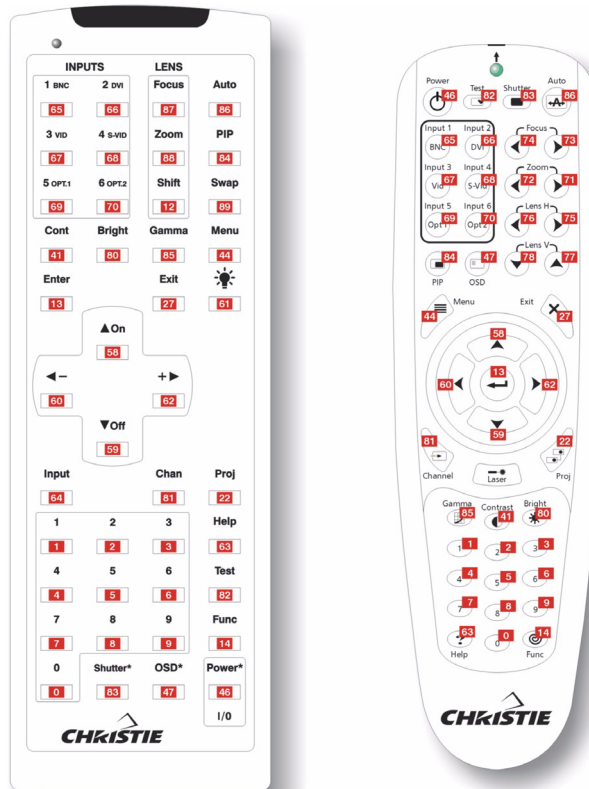| P2	0 = Off 1 = Responds to any protocol 10 = Protocol A 11 = Protocol B 12 = Protocol C 13 = Protocol D 14 = Protocol E 15 = Protocol F 16 = Protocol G
WIRE	Set to 1 to enable the wired keypad jack, 0 to disable.

EXAMPLES:
(KEN 12 12) - Sets IR Rear to Protocol C.
(KEN? |1) returns (ken! |001 001) - The current protocol for IR-front.

(KEY) KEY CODE

DESCRIPTION
To emulate use of the projector's keypad, you can send codes representing each key press. **NOTE:** *For all keys, sending a key code to depress a key also requires a code to release the key. The release code value is calculated by adding 128 to the send code value. The key will not be released until the appropriate release code is sent.*

(KEY) Key Code con't

EXAMPLES:
(KEY 044) - Send code for the MENU keypad command.
(KEY 172) - Release code for the MENU key command.

(KST) KEYSTONE

DESCRIPTION
Use KST to correct vertical keystone (14-50) so that the sides of the image do not slope away from each other, and the image is rectangular. The default value is 32 (no keystone).
For advanced 2D keystone using the Warp Module, see Warp Keystone Corners (WKC).

PARAMETER	DESCRIPTION OF USE
<No Parameter>	

(LBL) LEFT BLANKING

DESCRIPTION
Use LBL to blank the left edge of the image (0-1000). The amount of blanking feasible depends on the incoming source data.

PARAMETER	DESCRIPTION OF USE
<No Parameter>	Range 0 to 1000

EXAMPLES:
(LBL 40) - Set left blanking to 40.

(LCB) LENS CALIBRATE

DESCRIPTION
This forces the projector to calibrate the lenses/motors and is intended for use in conjunction with Christie Digital's Intelligent Lens System (ILS) or Lens Direct Motion (LDM) . Lens Calibration is not necessary if neither of these features is in use.
Lens Calibration is currently supported only on Roadie 35K and Christie Digital's Easy Rider Family of Projectors.
Motorized lens elements, which have positional feedback capability, require calibration before they can be used properly. Positional control is used in Christie Digital's Intelligent Lens System (ILS) or Lens Direct Motion (LDM) as listed elsewhere in this document . Lens calibration is mandatory for the use of these features.
For each such motorized adjustment there are two types of calibration possible:

1. Homing Reference Calibration establishes an absolute position reference for each motor independently. Reference calibration must be done each time power is cycled because this reference is lost when power is removed.

2. Motion Calibration calculates and sets motion parameters that optimize individual motor response for accurate positional placement and acceleration profile. This ensures that motors are controlled in a manner which will allow them enough power to overcome drag forces with minimum overshoot. This type of calibration only needs to be done once for each lens since the system will remember the values obtained, however it can be done at any time the user wishes.

(LCB) Lens Calibrate con't

DESCRIPTION

Calibration of the lens can be executed independently of the use of either of the ILS or LDM features; however it is required before either ILS or LDM features can be used successfully. All manually placed movement does not require calibration since the final position is directly controlled by the user activated keys and not by positional feedback.

If ILS is turned on when the projector is activated, lens calibration will proceed automatically (user will be prompted if necessary) provided that automatic lens calibration (see ALC) is also enabled. If the motion calibration has not been done, and ILS has been activated, the ALC setting will be over-ridden and full lens calibration will take place on power up regardless of the ALC setting. The ALC setting will become operational on the next power cycle.

If the lens is out of calibration for any reason (typically the lens has been removed or exchanged) and the ALC is set, no reference calibration will occur on power up and the current positional settings may be incorrect or corrupted. The user will have to manually intervene and recalibrate either by turning on the automatic calibration or by doing a manually initiated calibration.

The user is required to ensure all calibrations are done before using LDM commands, since this feature is by nature a user controlled movement.
If ILS or LDM features are not used, neither calibration is necessary and will not be asked for.

Roadie 35K / Upgrade to Optimus Lens Mount
(LCB 1), (LCB 3) are implemented and do a full calibration. The Roadie 35K always does an automatic calibration on lamp powerup.
Queries through (LCB?) are not implemented on Roadie 35K.

PARAMETER P1	DESCRIPTION OF USE Reference Calibration
	Value: **Description:** 1 = Relative Calibrate Motor Zero Reference Position 2 = Manual Calibrate Motion Parameters for Lens Motors 3 = Calibrate Calibrate both Reference and Motion Parameters
Query Values	1 = Calibration has been done 0 = Calibration has not been done
P2	Motion Calibration

EXAMPLES:

(LCB 3) - Stop Horizontal Movement, Lens will not stop until this command is issued or the end stop is reached.

(LCB?) - Query the current status of calibration, responds with (LCB!1 0) indicates that reference is calibrated but motion parameters are not.

(LCN) LENS CENTER

DESCRIPTION
This command will move each of the lens motors to their center position. This will also re-synchronize the position of the lens hardware with the values stored in memory. If an older motorized lens mount is being used, this command will calibrate all motors.
This command is only implemented on the Roadie HD+35K model.

PARAMETER	DESCRIPTION OF USE
<No Parameter>	

(LCO) LAMP CONDITIONING

DESCRIPTION
This command is unique to Philips UHP lamp driver as used in Zeus Dual Lamp Single Chip projectors. UHP lamps can be subject to random image flicker. This control pulses the lamp and causes the electrodes to wear back down to a single point. The reduction of flicker is not likely to be immediate.

PARAMETER	DESCRIPTION OF USE
<No Parameter>	This command accepts either 0 or 1. 0 = Off, 1 = On.

(LDM) LENS DIRECT MOTION

DESCRIPTION
Used to directly control the position of a motorized lens. Element applies only to the focus and zoom motorized lens. **NOTE:** You must first ensure that calibration has been done before LDM will work correctly.
LDM commands will only work if the command has been enabled (the default condition). The lens motors must also have been calibrated as described within Lens Calibration (LCB). It is important to note that calibration is not automatic; the user will be required to do at least a Home Reference Calibration before the LDM command can be used successfully (refer to LCB for a full description).

There are two types of LDM motion control possible: positional placement or tracking placement.
Positional placement allows the user to enter a positional value and have the respective motor move to that location. The commanded value must be in the user specified input range (or the default range if not changed). Positional placement allows accurate placement of the motor and is best suited for single location commands; however multiple locations can be sent as a sequence of commanded positions and the motor will follow the commanded position as fast as it is physically possible to do so. Issuing a new command will automatically cancel a previous one, with the new command starting where the last one left off (movement finished or not). The currently active command will proceed to the last destination entered and will stop automatically when that position has been reached. When using positional placement with repeated commands the position may seem to lag the commands by a significant amount caused by limitation of the motor top speed and the ability to physically track positional commands.

Tracking placement is intended for user input from control devices such as a trackball or scroll wheel. In this case the user entry is still a series of commanded positions as before; however these positions are used to calculate a speed and direction of motor movement based on the incremental change in commanded positions. This is to say that the input is treated as velocity inputs and not positional inputs. Therefore as long as the input is changing the specified motor will move with a speed and direction proportional to the motion of the device. Motion will stop shortly after user input stops. Final position is tied to where and when the input stops changing, and NOT to a specific commanded position.

(LDM) Lens Direct Motion con't

When using tracking mode, the sensitivity of the motion can be adjusted by modifying the accumulator depth and/or the gain factor. A shorter accumulator depth will make the response more active, while a longer depth will make it more stable. A smaller acceleration factor will cause more rapid acceleration, while a larger factor will provide better positional control. The effects are similar and additive for these two parameters.   These two parameters only have an effect on tracking mode and do nothing when positional commands are used instead. The user may scale the input to define a full scale range defined by a start and end position. By default these values are 0 and 65535. The user may change this to any values in between (provided start is less than end) these limits. The command will automatically scale the user input to the full range of possible motion for that motor. Target positions are stated in the user scale, so if the user scales the input the target command should be a number within that range. If not set, the default values will apply.

The user can also query the projector to find the current user parameters for the LDM command and also to read back the current position of the requested motor.   The position that is read back is also scaled to the user input scale.

The user may user a combination of current position read back and setting of target position to control the motors by a user implemented scheme; or simply use it to send the motor to a desired position.

It is recommended that ILS be turned off if LDM commands are to be issued as a frequent sequence of positions. This will prevent ILS from over-riding LDM commands. All automatic motion, including calibration and ILS, have priority over LDM commands.

PARAMETER	DESCRIPTION OF USE
see below	see below

Commands:

Commands will cause an action to be executed by the projector if it supports the LDM command.

Command	Parameter 1	Parameter 2	Parameter 3	Description
LDM	N			Disable = 0/ Enable = 1 Lens Direct Motion
LDM	M	pos	k	Move motor M to position pos, k selects the mode of motion
LDM	"RANGE"	minval	maxval	Set scaling so that minimum value is minval, maximum is maxval
LDM	"DEPTH"	value		Set Accumulator depth, a smaller value increases the responsiveness of the input, while a higher value allows smoother transitions
LDM	"GAIN"	value		Set the acceleration gain factor, a smaller value will make the acceleration more sensitive to changes in the user input, while a higher value reduces the sensitivity to change in the user input

Requests:

Requests	Parameter 1	Description
LDM?		Returns all user settable parameters in the following order: enable state, minimum range value, maximum range value, accumulator depth, acceleration factor
LDM?	N	Returns the current position of motor N, proportionally scaled to user set values of minval and maxval

(LDM) Lens Direct Motion con't

Parameters:

Descriptor	Value	Description
N	0	Select the zoom motor
	1	Select the focus motor
minval, maxval	{0, 65535}	This sets the input range to be between minval and maxval
pos	{0, 65535}	This is a relative position which lies proportionally between minval and maxval
Command Literal	"RANGE"	Set the range parameters
	"DEPTH"	Set the accumulator depth
	"GAIN"	Set the acceleration factor
k	0	Use positional placement, specified motor will move to commanded position
	1	Use tracking mode, user input will be a series of positional values within the set input range.
value	v	Parameter value for one of the use alterable parameters

NOTE: YOU MUST FIRST ENSURE THAT CALIBRATION HAS BEEN DONE BEFORE LDM WILL WORK CORRECTLY.

EXAMPLE:
(LCB 1) - Do a home reference calibration.
(LDM 1) - Enable LDM for use (default is ON) NOTE:When disabled LDM commands will not function.
LDM "RANGE" 0 40000) - Set so that 0 represents the starting position and 40,000 the end position of the motor range.
(LDM 0 20000) - Move the zoom motor to the point 20,000. Positional mode is assumed.
(LDM 0 20000 0) - Identical to the above command, but positional mode is explicitly stated.
(LDM 0 20000 1) - A single position to be used (requiring a series of other positions) to cause the motor to move in a given direction with a speed proportional to the change in the input. The final position is not directly tied to the specific values being input. Instead, the speed and direction are set by an average response to changes in the user input and motion will continue until an end stop is hit or the use input ceases to change.
(LDM? 0) - Report location of zoom motor.

(LDT) LEVEL DETECTOR

DESCRIPTION
Enable (1) or disable (0) the LDT (Level Detector Test) mode that can aid in setting up input levels. Use in conjunction with LDV (Level Detector Value), which defines a threshold below which all incoming colors will be turned black, and above which all colors will turn to white. At this point, the Level Detector will be enabled.

PARAMETER	DESCRIPTION OF USE
<No Parameter>	Enable/Disable

EXAMPLES:
(LDT 1) - Turn on level detector.
(LDT 0) - Turn off level detector.

(LDV) LEVEL DETECTOR VALUE

DESCRIPTION
Use an LDV setting of 1 to 1023 when the LDT (see above) will be enabled. This is a threshold below which all incoming colors will be turned black, and above which all colors will turn to white, and is an aid for setting up input levels.

PARAMETER	DESCRIPTION OF USE
<No Parameter>	

EXAMPLE:
(LDV 500) - Set level detector to 500. All data greater than or equal to 500 will be shown in the image.

(LHO) LENS HORIZONTAL OFFSET

DESCRIPTION
Adjusts horizontal offset on projectors having a motorized lens mount, and requires keypad emulation.

PARAMETER	DESCRIPTION OF USE
<No Parameter>	

EXAMPLES:
(LHO K3) - Move the image to the right.
(LHO K2) - Move the image to the left.
(LHO K0) - Stop horizontal movement (without this, lens movement will continue until it reaches the end stop).
NOTE: *To "nudge" the image a minimum distance, script in a delay between (LHO K3) and (LHO K0). Depending on your application, a delay of at least 20-30 milliseconds may be sufficient.*

(LLC) LITELOC CALIBRATION

DESCRIPTION
Use LCC to calibrate LiteLOC to the current lamp and optical response.
NOTES: 1) *LiteLOC calibration can take several minutes to complete and will vary the lamp output during calibration.* **2)** *All lamp settings will return to their initial condition once the calibration has been completed.*
NOTICE: *Custom settings allow the user to set liteLOC to any value within the specified range. The software does not check that the specified values are functional.*

PARAMETER	DESCRIPTION OF USE
P1	**Calibration** 0 = Use default settings for LiteLOC 1 = Run automatic calibration of LiteLOC on current projector, or if more parameters present, 1 = Set custom gain to offset
P2	Gain value from 0 to 32767.
P3	Offset value can be between -32768 to 32767.

EXAMPLES:
(LLC) - Initiate the calibration cycle.

(LLM) LAMPLOC MODULE

DESCRIPTION
This command groups a number of commands related to LampLOC control.

PARAMETER P1	DESCRIPTION OF USE Command Summary 0 = Moves the motors (see below for details) 1 = Calibrate LampLOC motors 2 = Do automatic lamp alignment for optimum light output
P1	Message = Move Motor 0 = Moves motor
P2	0 = x specifies which motor is to be moved 1 = y 2 = z
P3	Desired lamp position / destination

(LME) LAMP MESSAGE ENABLE

DESCRIPTION
Display of the lamp timer message when the lamp has reached its *Lamp Limit* setting.

PARAMETER <No Parameter>	DESCRIPTION OF USE

EXAMPLES:
(LME 1) Enable On
(LME 0) Disable Off

(LNG) LANGUAGE

DESCRIPTION
Use LNG to get/set the current language used in the projector's menu system.

PARAMETER <No Parameter>	DESCRIPTION OF USE Set the system language: 1 - English 2 - French 3 - Spanish 4 - German 5 - Italian

(LOP) LAMP OPERATION

DESCRIPTION
NOTE: *For **DS+60**, **Matrix 3000**, **RMPSP-D100U** and **RPMSP-DxxxU** projectors only.*
Use LOP to turn on either or both of the projector's lamps.

(LOP) Lamp Operation con't

PARAMETER	DESCRIPTION OF USE
<No Parameter>	1 = Lamp 1 only 2 = Lamp 2 3 = Both lamps - NOTE: Not available on RPMSP-DxxxU models.

EXAMPLE:
(LOP 1) - Use lamp 1

(LPC) LAMP CHANGED

DESCRIPTION
NOTE: *Not used in dual lamp models such as **DS+60** and **Matrix 3000**.*
Use LPC to record a new lamp serial number (8 characters max.) in projector memory. This will automatically reset the projector's lamp timer so that it begins to log time for the new lamp.

PARAMETER	DESCRIPTION OF USE
<No Parameter>	

(LPH) LAMP HOURS OF USE

DESCRIPTION
For most projectors, use the request LPH to find out the number of hours logged on the current lamp. In projectors having two lamps, such as the *DS+60* and *Matrix 3000* projectors, the read-only reply to (LPH?) will include both lamps. Include a "1" or "2" to find out the hours for either lamp individually—i.e., use (LPH?2) to find out the hours logged on Lamp 2 only.

PARAMETER	DESCRIPTION OF USE
<No Parameter>	

(LPI) LAMP INTENSITY

CONTROL GROUP: Preference   **SUBCLASS:** Power Up   **ACCESS LEVEL:** Operator

DESCRIPTION
Use LPI to specify a desired light intensity setting (0-9999 for any model) for the lamp, and automatically put the lamp into the "Intensity" mode also known as LiteLOC. Not available on models without LiteLOC, such as *DS+60 and Matrix 3000***.**

PARAMETER	DESCRIPTION OF USE
<No Parameter>	Range 0 to 999

EXAMPLE:
(LPI 80) - Set the intensity set point to 80.

(LPL) LAMP LIMIT

DESCRIPTION

Use LPL to specify the number of hours the lamp can operate within the projector before a warning message appears telling the user that the lamp limit has expired and the lamp needs replacement (System Warning also given: LEDs flash). The range varies with projector—do not set beyond the expected life for the type of lamp installed.

PARAMETER	DESCRIPTION OF USE
<No Parameter>	

(LPM) LAMP MODE

DESCRIPTION

Use LPM to control how you run the lamp.

If you choose constant intensity or constant brightness, you must also specify the desired level using the corresponding LPI (intensity) or LPP (power) command. See *(LPI) Lamp Intensity* and *(LPP) Lamp Power*.

NOTE: DS+60 and Matrix 3000 have no "intensity" mode, thus LPM can be only "0" or "2".

PARAMETER	DESCRIPTION OF USE
<No Parameter>	0 = max brightness 1 = maintain intensity setting for models with LiteLOC 2 = maintain power setting

(LPP) LAMP POWER

DESCRIPTION

Use LPP to set the desired lamp power level (in watts—range depends on the projector model), and automatically put the lamp into the "Power" mode.

PARAMETER	DESCRIPTION OF USE
<No Parameter>	Set the Lamp power.

EXAMPLE:
(LPP 300) - Sets lamp power to 300W.

(LPS) LAMP STATUS

CONTROL GROUP: Preference   **SUBCLASS:** Power Down   **ACCESS LEVEL:** Operator

DESCRIPTION

NOTE: *For DS+60, Matrix 3000 and DW30 projectors only.*

Returns the status to the requested current lamp(s). On powerup, both lamps' status is set to good. When "Shutdow If Fan Fails" flag is set (default) a fan 3 failure results in Lamp 1 being turned OFF. Similarly, fan 5 failure will result in LAmp 2 being turned OFF.

PARAMETER	DESCRIPTION OF USE
P1	1 = Lamp 1 2 = Lamp 2

(LPS) Lamp Status con't	
P2	0 = Good 1 = Assiciated Fan Failure 2 = Lamp Failed to Strike 3 = Lamp Turned OFF Unexpectedly 4 = Lamp Interlock Tripped 5 = Lamp 2
EXAMPLE: (LPS? 1) - Would give (LPS! 1 0) for Lamp 1 Good (LPS?) - Would give (LPS! 1 0 2 2) for Lamp 1 Good, Lamp 2 Failed to Strike	

(LPZ) LAMP SIZE

DESCRIPTION
NOTE: *For Roadie 25K only.*
Use LSZ to define or request which lamp size—2000, 3000, 4500, or 6000 kW—is installed in the projector.

PARAMETER <No Parameter>	DESCRIPTION OF USE

EXAMPLE:
(LSZ 2000) - Set the lamp size to 2000 kW.
(LSZ?) - What is the current lamp size setting?
(LSZ!2000) - The current lamp size defined in memory is 2000 kW.

(LST) LAMP STATISTICS

DESCRIPTION
NOTE: *This selection is only necessary when using projectors that are HD (1920x1080) resolution.*
HD class projectors have a memory module attached to the lamp which logs or contains lamp information that is intended to travel with the lamp. This allows lamps to travel between different machines and retain a history of lamp use. The information contained within the logs depends on the type of projector in use (currently either low power or high power HD projectors). Please refer the module specification for details on the data sampled in each case.

New lamp related data is gathered on each power up and then sampled at regular intervals thereafter. A new record is made each time a significant change occurs in any monitored variable. This provides an irregular sampling which allows for maximum data collection over extended time periods. When triggered, all variables are recorded and time-stamped to capture the current state of the projector as it is related to the lamp. These are referred to as **standard records**. If any variable crosses a critical threshold the associated standard record is copied and stored as a **critical record**. This allows a separate data tracking of problem events. In addition to this, a summary is kept of significant data to report average values and durations as well as an indicator of the amount of variability in the data points. This is referred to as a **summary record**. Therefore a full lamp data set contains the lamp information table, summary table and any existing standard and/or critical records. Any number of lamps (up to the physical limit of memory) can be created and stored. High power lamp logs are consistent with all high power projectors, and low power logs with low power projectors. High power logs are not compatible with Low power logs.

(LST) Lamp Statistics con't

The current lamp record is allowed to make free use of all remaining memory within the storage device. Once the memory becomes full new standard records will replace the oldest standard record, and new critical records will replace the oldest critical record. This allows retention of records to a minimum depth. This depth has a default value of 30 standard records and 15 critical records (minimum), but can go as deep as memory will allow for a maximum.

In high power units lamps may have their bulbs changed. This is handled by creating a new lamp data set and copying over the lamp serial number, essentially creating a new lamp data set that can be cross-referenced to the old by serial number. This is available by a variation of the command listed below (also available from user on-screen menu when it applies).

When lamps are first installed their memory space will be unformatted. To allow the system to start up smoothly without missing data a unspecified lamp data set is created and begins logging immediately; however the serial number will be listed as NA (not available) and will have to be entered by the user at some later time.

Alternatively a new lamp data set can be created at any time by entering a new lamp install command (also available from user on-screen menu). When new lamps are installed the existing data is compressed to the last specified number of records to keep (standard and critical are separately specified). This opens up space for a new lamp data set.

A new lamp data set can not be created if no serial number exists in the current lamp data set. This restriction will be removed as soon as a valid serial number is entered in the current lamp data set by the user. Typically new lamps are created with the serial number included so this restriction normally would not be encountered.

When the memory becomes full enough, it will no longer accept new lamp data sets. This can be over-ridden by downloading the existing data and re initializing the memory to start afresh; however it is not expected to be necessary.

Some of the commands listed below make use of a number of constant parameters to protect the data base from accidental changes which cannot be reversed. These commands are highlighted in light red and are generally considered diagnostic or corrective in nature and should not be used under normal circumstances.

A number of options are available for listing collected data and are shown below in the tables.

Please refer to the module specification for more detailed information.

Definitions for the parameters used by each command are listed below.

Parameter	Comments		
N	value	Specifies lamp N	
	0	Specifies all lamps	
	"c" or "C"	Specifies the current lamp only	
i	0	Specifies all data records	*Only 1 copy of lamp and summary is available for return*
	1	Specifies main lamp table only	*Only 1 copy of lamp and summary is available for return*
	2	Specifies summary table only	*Only 1 copy of lamp and summary is available for return*
	3	Specifies standard record only	
	4	Specifies critical records only	
s	Starting value of record to return		
k	Number of records to return starting at and including s		

(LST) Lamp Statistics con't

Data Command	Param 1	Param 2	Param 3	Param 4	Comments
LST	101	1			Create a New Lamp Data Set, but keep current lamp SN and increment bulb count (this command applies only to Projectors in which the bulb may be changed)
LST	102	SN			Create a new lamp data set with serial number SN
LST	102	SN	std	crt	As above, but keep "std" of the previous lamp's standard records and "crt" of the previous lamp's critical records
LST	103	SN			Change current data set serial number to SN
Diagnostic and Maintenance Commands					
Command	Param 1	Param 2	Param 3	Param 4	Comments
LST	55	88	55	N	N=0 enable lamp logging, N=1 disable lamp logging (blocking on)
LST	55	88	55	45	Force the addition of a new standard record to current data set
LST	55	88	55	46	Force the addition of a new critical record to current data set
LST	55	88	55	77	Delete all data sets and re-initialize to a new data set with no SN

NOTE: *Highlighted commands are primarily intended for diagnostics and error recovery.*

Request	Param 1	Param 2	Param 3	Param 4	Comments
LST?					Return the number of lamp data sets present in log.
LST?	N				Return all data for lamp N
LST?	N	I			Return all data of type i for lamp N
LST?	N	i	s		Return data records of type i for lamp N (data types 3 and 4 only)
LST?	N	I	s	k	Return range of data records of type i for lamp N (data types 3 and 4 only)

NOTE: M*ultiple returns for the same lamp applies only to records for which multiple entries may exist (standard or critical records)*

EXAMPLES:

Install a new lamp with the given serial number keep the default number of standard and critical records
(LST 102 "123456789")
(LST!102 "New Lamp Installed SN: 123456789.")

Install a new lamp with the given serial number keeping at most 10 standard records and at most 20 critical records of the last data set. Varying this number increases or decreases the amount of free memory for new records, depending on the values sent.
(LST 102 "123456789" 10 20)
(LST!102 "New Lamp Installed SN: 123456789.")

Change the existing lamp serial number only. This allows the lamp SN to be synchronized to the installed lamp.
(LST 103 "123456789A")
(LST!103 "Current Lamp SN:123456789A.")

Allow automatic data collection, this is on by default on every power cycle
(LST 55 88 55 0)
(LST!55 88 55 0 "Auto-Updating has been Enabled.")

Block automatic data collection, this is for diagnostic purposes only
(LST 55 88 55 1)
LST!55 88 55 1 "Auto-Updating has been Blocked.")

Force a standard record to be installed, largely for diagnostic purposes
(LST 55 88 55 45)
(LST!55 88 55 45 "Number of Standard Records in Lamp Log Is: 1.")
(LST 55 88 55 45)
(LST!55 88 55 45 "Number of Standard Records in Lamp Log Is: 2.")
(LST 55 88 55 45)
(LST!55 88 55 45 "Number of Standard Records in Lamp Log Is: 3.")

Force a critical record to be installed, largely for diagnostic purpose
(LST 55 88 55 46)
(LST!55 88 55 46 "Number of Critical Records in Lamp Log: 1.")
(LST 55 88 55 46)
(LST!55 88 55 46 "Number of Critical Records in Lamp Log: 2.")
(LST 55 88 55 46)
(LST!55 88 55 46 "Number of Critical Records in Lamp Log: 3.")

Delete entire Data log, a new data set is automatically created without a lamp serial number, You must install a lamp serial number (if not already done) before the lamp can be changed
(LST 55 88 55 77)
(LST!55 88 55 77 "Succeeded in Initializing Lamp Module Log.")
(lst?)
(LST!001 "Number of Lamps Loaded: 1.")
LST 102 "987654321" 10 20)
(65535 00000 ERR007 "LST: Current Lamp Serial Number is Not Valid, please Enter before changing lamp.")
(LST 103 "987654321")
(LST!103 "Current Lamp SN:987654321.")

<u>**Query Examples:**</u>

Query for number of lamp data sets (the number of lamps that have been installed)
(lst?)
(LST!002 "Number of Lamps Loaded: 2.")

Get all data for specified lamp
(lst? 1)
(LST!"Lamp Data Table Number: 1.")
Note: list can be very long, rest of the data is not shown in this document
(lst? 2)
(LST!"Lamp Data Table Number: 2.")
NOTE: *List can be very long, rest of the data is not shown in this document.*

List only the main data table for lamp 1
(lst? 1 1)
(LST!"Lamp Data Table Number: 1.")
NOTE: *List can be very long, rest of the data is not shown in this document.*

List the main table for the current lamp (you don't need to know the number)
(lst? "c" 1)
(LST!"Lamp Data Table Number: 2.")
NOTE: *List can be very long, rest of the data is not shown in this document.*

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(LST) Lamp Statistics con't
List type 3 data for lamp 2 starting at the 2nd record and include up to 3 records (if that many exist) (lst? 2 3 2 3) Note: list is long, only the initial line from each response is shown in this document (LST!"Lamp 2: Data for Standard Record number 2 of 5.") (LST!"Lamp 2: Data for Standard Record number 3 of 5.") (LST!"Lamp 2: Data for Standard Record number 4 of 5.")

(MFT) MENU FONT
DESCRIPTION Use MFT to choose whether menu font size is normal (0) or large (1).

PARAMETER <No Parameter>	DESCRIPTION OF USE Choose large font or small font.

(MLK) SOURCE MEMORY LOCK
DESCRIPTION Use MLK to lock (1) or unlock (0) a specific source setup. Refer to *2.5 Accessing Specific Source Setups*.

PARAMETER <No Parameter>	DESCRIPTION OF USE Lock or unlock a specific souce setup.

(MNU) MENU STATUS

DESCRIPTION

The MNU command has two uses. One is to get the current status of the menus and customize the menu structure and the other is to define and activate a custom menu.

When using serial commands to operate the menu, likely don't want the menu to appear on the screen. To prevent the menu from appearing on the screen while using serial commands, use the OSD command. In addition, you may want to disable the keypads using the KEN command.

Some menus automatically change particular settings to make adjustments easier. Depending on the context, you may also need to send:

- ACE x   to enable or disable Automatic Color Enables
- MNU 3 x   to enable or disable Automatic Test Pattern selection

MNU can also be used to create a custom menu. For example, (MNU "My Menu" "BRT" "CON" "PIP"), produces a custom menu called "My menu" consisting of the Brightness, Contrast, and Picture in Picture Enable controls.

You can combine this with a RTE FUNC key event to make the custom menu available from a keypad, see Example below.

Note: *This menu is not saved anywhere - as soon as you exit from it, it will no longer exist and when you want to display it again you must send the MNU command, with all the controls, again. It is expected that this command will be used in conjunction with a function key RTE command which will save the command. This will allow the menu to appear anytime the specified <func>-<#> key sequence is pressed.*

(MNU) Menu Status con't

PARAMETER P1	DESCRIPTION OF USE
	0 = presentation level
	1 = main menu
	2 = sub menu
	3 = enable or disable automatic test patterns

P2	When P1 = 2, #0-9
	# = the number of the submenu you wish to go
	When P1 = 3, #+0-1, to enable or disable automatic test patterns
	# = 0, restore normal operation
	# = 1, disable automatic test pattern

EXAMPLE:
(MNU "My Menu" "BRT" "CON" "PIP") - creates a menu called "My Menu" with the Brightness, Contrast, and Picture in Picture Enable controls.

(MOT) MOTION FILTER

DESCRIPTION

Use MOT to control how de-interlacing is managed.

PARAMETER	DESCRIPTION OF USE
	0 = Auto — software determines the best option.
	1 = Still — produces crisp images when there is no motion.
	2 = Motion — for video not originally from film, or for moving computer-generated images
	3 = Film — performs inverse telecine operation to reproduce accurately and crisply material originating from 24Hz film.

(MSH) MENU SHIFT HORIZONTAL

DESCRIPTION
Change the horizontal position of the main menu.

PARAMETER <No Parameter>	DESCRIPTION OF USE
	View/set the horizontal position of the main menu.
	0 = Left, up to 466 right

EXAMPLES:
(MSH ?) - Get current horizontal position of main menu.

CHRISTIE®

(MSP) MENU LOCATION

DESCRIPTION
Set the default menu position on the screen.

PARAMETER	DESCRIPTION OF USE
<No Parameter>	View/set the preset menu position. Valid options are: 0 = 4:3 TopLeft 1 = 4:3 Inset 1 2 = 4:3 Inset 2 3 = 16:9 TopLeft 4 = 16:9 Inset 1 5 = 16:9 Inset 2

EXAMPLES:
(MSP ?) Get current menu position preset.
(MSP 0) Set main menu position to 4:3 TopLeft, the top left corner of screen.

(MSV) MENU SHIFT VERTICAL

DESCRIPTION
Change the vertical position of the main menu.

PARAMETER	DESCRIPTION OF USE
<No Parameter>	View/set the vertical position of main menu. 0 = Top, up to 350 down

EXAMPLES:
(MSV ?) - Get current vertical position of main menu.
(MSV 50) - Set main menu vertical position to 50 pixels from top edge.

(NAM) SOURCE CHANNEL NAME

DESCRIPTION
 Set / get a source setup name. Refer to *2.5 Accessing Specific Source Setups*.

PARAMETER	DESCRIPTION OF USE
<No Parameter>	

EXAMPLES:
(nam "Bobs PC") - name the current source setup as "Bobs PC"

(nam s5 "Sun1") - name source setup #5 as "Sun1"

(nam s0 "Test") - name all source setups as "Test"

(NRD) NOISE REDUCTION

DESCRIPTION
Use NRD to set the noise reduction level.

PARAMETER	DESCRIPTION OF USE
<No Parameter>	Set the noise reduction for slot x, input y.

(NSI) NUMBER SELECT IMAGE

DESCRIPTION

Use NSI to use the numeric keys 1-8 as input keys for the main image. This option is only effective when the Menu system is not active, for example when Picture-in-Picture is enabled.

PARAMETER	DESCRIPTION OF USE
	Use the numeric keys 1-8 as input keys for the main image. 0 = Never 1 = Only when the PIP window is active 2 = Always

(NTR) NETWORK ROUTING

DESCRIPTION

Set routing for ASCII messages.

PARAMETER	DESCRIPTION OF USE
<No Parameter>	Used to enable or disable daisy chaining. 0 = RS232, RS422 & Ethernet communications are all separate from one another 1 = RS422 port(s) is/are connected to the RS232 network 2 = The Ethernet port is connected to the RS232 network 3 = RS232, RS422 & Ethernet are all connected to each other

EXAMPLES:

(NTR?l) - List routing options.
(NTR 0) - Each connection is routed separately.
(NTR 3) - Full daisy-chaining.

(OSD) ON SCREEN DISPLAY

DESCRIPTION

Enable (1) or disable (0) the on-screen display of the menus system.

PARAMETER	DESCRIPTION OF USE
<No Parameter>	Enable/Disable

EXAMPLES:

(OSD ?) - Get current state of OSD. 0 when OSD is hidden, 1 when OSD is displayed.
(OSD 1) - Enable OSD
(OSD 0) - Disable OSD

CHRISTIE

(OTF) OUTPUT FORMAT

DESCRIPTION

Change output format for Cine-IPM 2K.

NOTE: *DVI-1 has lower 8 bits; DVI-2 has higher 2 bits).*

PARAMETER <No Parameter>	DESCRIPTION OF USE 0 = Single Link on DVI-1 or DVI-2 1 = Twin Link

(OTR) OUTPUT RESOLUTION

DESCRIPTION

Change output resolution for Cine-IPM 2K.

PARAMETER <No Parameter>	DESCRIPTION OF USE 0=1280x720 (HD2) 1=1280x1024 (SXGA) 2=1400x1080 (SXGAp) - RPMSP Default 3=1920x1080 (HD) 4=2048x1080 (DC2K) - CineIPM 2K default 5=1024x768 (XGA) 6=1920x1200 (WUXGA)

(PAP) PIP ASPECT RATIO PRESET

DESCRIPTION

Use PAP to select the preferred aspect ratio for your Picture-in-Picture window.

PARAMETER <No Parameter>	DESCRIPTION OF USE 0 = Default 1 = Anamorphic 2 = Custom (Response only – The vertical stretch does not correspond to one of the settings.)

EXAMPLE:
(OST 1) - Enable OSD transparency

(PBC) PIP BORDER COLOR

DESCRIPTION
This control lets you choose the color of the optional border around the picture-in-picture image. The border can be disabled by setting the border width PBW to zero. Valid options are:
Also refer to *(PBC) PIP Border Color*.

PARAMETER	DESCRIPTION OF USE
<No Parameter>	0 = Black
	1 = Dark Red
	2 = Dark Green
	3 = Dark Yellow
	4 = Dark Blue
	5 = Dark Magenta
	6 = Dark Cyan
	7 = Dark Grey
	8 = Light Grey
	9 = Red
	10 = Green
	11 = Yellow
	12 = Blue
	13 = Magenta
	14 = Cyan
	15 = White

EXAMPLE:
(PBC 0) - Select black PIP border.

(PBW) PIP BORDER WIDTH

DESCRIPTION
To specify the width (0-10) of the border of the Picture-in-Picture window. Also refer to *(PBC) PIP Border Color*.

PARAMETER	DESCRIPTION OF USE
<No Parameter>	

(PDT) PEAK DETECTOR

DESCRIPTION
Enable (1) or disable (0) the peak detector test mode as an aid in settling up input levels.

PARAMETER	DESCRIPTION OF USE
<No Parameter>	Enable/Disable

EXAMPLES:
(PDT 1) - Enable peak detector.
(PDT 0) - Disable peak detector.

(PHP) PIP HORIZONTAL POSITION

DESCRIPTION
Set the horizontal position (0-100) of the picture-in-picture window. Range is a percentage of the screen size.
NOTE: *Not available in v1.0.*

PARAMETER	DESCRIPTION OF USE
<No Parameter>	

(PHS) PIP HORIZONTAL SIZE

DESCRIPTION
Set what percentage (0-100) of the screen width to use for the width of the picture-in-picture window. Height of the window will then be determined by the aspect ratio of the input image.
NOTE: *Not available in v1.0.*

PARAMETER	DESCRIPTION OF USE
<No Parameter>	

(PIP) PICTURE IN PICTURE

DESCRIPTION
Use PIP to turn picture-in-picture on (1) or off (0). **NOTE:** *Not available in software v1.0*

PARAMETER	DESCRIPTION OF USE
<No Parameter>	This command accepts either 0 or 1. 0 = disables PIP, 1 = enables PIP

(PJH) PROJECTOR HOURS OF USE

DESCRIPTION
Reports the number of hours (0-16,777,215) the projector has been operated, including cool down modes.

PARAMETER	DESCRIPTION OF USE
<No Parameter>	

EXAMPLE:
(PJH ?) - Returns hours elapsed on projector.

(PLK) PARAMETER LOCKOUT

DESCRIPTION

Use PLK to specify which menu options are to be locked from the user (note: a lockout can still be accessed via ASCII command). In a PLK message, P1 represents the corresponding function code (e.g., CNT, CTM, etc.) you wish to lock or unlock. Where several related options—such as blanking controls—share a single lockout, locking or unlocking any one of the options toggles the full lockout status.

To lock/unlock all options, omit any P1 function code from your PLK *set* message.

PARAMETER	DESCRIPTION OF USE
<No Parameter>	Lock/Unlock

(PLK) Parameter Lockout con't

EXAMPLE:
(PLK "CON" 1) - Lock the "contrast" control
(PLK) - Lock all possible options
(PLK "BRT" 0) - Unlock the "Brightness" control

(PND) PLUG & DISPLAY MODES

DESCRIPTION

Use PND to specify the display mode requested of the video source. Note: The source computer may need to be rebooted before this setting will take effect.

PARAMETER	DESCRIPTION OF USE
	0= Default Timing (Native Resolution @ 60Hz)
	1=1024 x 768 x 116Hz
	2=720p (1280 x 720 x 60Hz)
	3=1080p50/1080i50
	4=1280 x 1024 x 110Hz
	5=1400 x 1050 x 60Hz
	6=1400 x 1050 x 102Hz
	7=DC2k (2048 x 1080 x 60Hz)
	8=1080p60/1080i60
	9=1080p24/1080p30Hz
	10=1080p59/1080i59 1:1.001 (V1.6j)
	11=1080p23/1080p29 1:1.001 (V1.6j)
	12=WUXGA 60Hz (V1.7D)

EXAMPLES:
(PMT 1) - Mutes the picture.
(PMT 0) - Unmutes the picture.

(PNG) PING

DESCRIPTION

Use PNG to request and get basic projector information such as the type of projector & main software version installed on the TIPM (10-bit Image Processor Module).

PARAMETER P1	DESCRIPTION OF USE = Christie projector type
31	= a projector listed in *1 Overview* (always). These all include a TIPM
P0	= the projector is not initialized
P2	= Major s/w version# (0-99)
P3	= Minor s/w version# (0-99)

(PNG) Ping con't	
P4	= Maintenance version# with no functional change (a-z)
P5	= Beta version#, if applicable only (1-199)
P6	= Variation, such as an OEM. Preceded with "T" (T1-T63)

EXAMPLES:

(png?)(png! 031 001 000)// - TIPM version 1.0

(png?)(png! 031 002 005 b)// - TIPM version 2.5b

(png?)(png! 031 003 001 T005)// - TIPM version 3.1 T5 (=variation of released version v3.1)

(png?)(png! 031 001 000 c 045 T002)// - TIPM version 1.0c.045 T2 (=variation of beta version 1.0c.045)

(PPP) PIP POSITION PRESET

DESCRIPTION
Use PPP to select the preferred position and size for the picture-in-picture window.

PARAMETER	DESCRIPTION OF USE
	0 = Top right
	1 = Top left
	2 = Bottom left
	3 = Bottom right
	4 = Custom (response only-the size and position do not correspond to any of the defaults).

(PPS) PIP SWAP

DESCRIPTION
Use to swap the picture-in-picture window with the main window. PPS is a toggle command with no parameters.
NOTE: *Not available in software v1.0*

PARAMETER <No Parameter>	DESCRIPTION OF USE

EXAMPLE:
(PPS) - Swap inputs.

(PRH) PROJECTOR RENTAL HOURS

DESCRIPTION
Use PRH to find out the number of hours (0-16,777,215) the projector has logged during a rental period.

PARAMETER <No Parameter>	DESCRIPTION OF USE

(PSW) ALTERNATIVE SERVICE PASSWORD

DESCRIPTION

Use PSW to find out the most recently defined password for accessing the service menu, or to define an alternative service password (range = 0-32768). Note that defining an alternative PSW simply *adds* a password to projector memory so that you may use either the original factory-defined Christie password (which is always valid) *or* this new password. Because (PSW?) will find only the most recently defined password, the factory-defined password cannot be retrieved in this manner once you have created an alternative password. Use PWE to enable/disable passwords.

PARAMETER	DESCRIPTION OF USE
<No Parameter>	Enable/Disable

(PVP) PIP VERTICAL POSITION

DESCRIPTION

Sets the vertical position (0-100) of the picture-in-picture window. Values represent what percentage of the screen size is used for the picture-in-picture window.
NOTE: *Not available in software v1.0*

PARAMETER	DESCRIPTION OF USE
<No Parameter>	Range 0 to 100

(PWE) PASSWORD ENABLE

DESCRIPTION
Enable (1) or disable (0) the service password for access to the service menu.

PARAMETER	DESCRIPTION OF USE
<No Parameter>	Enable/Disable

(PWR) POWER

DESCRIPTION

Use PWR to turn the projector power on or off, or to use special modes during a download, or to see the current power state.

Note that "Boot" is a special mode activated automatically when *KoRE 10-bit Librarian* downloads new code to the projector—do not use the ASCII Boot setting. If a problem is detected with the main code on power up, the projector will go directly into boot mode and stay there until new code is downloaded. Likewise, the no-lamp mode is only used when downloading code to certain sub-modules that are not accessible when all power is off. This mode can only be toggled to and from the power "off" state. If more parameters are sent they are ignored.

The 'warm up' state is returned when the projector is in the process of changing between powered down and up, and is not intended as a *set* message. If you send a warm up *set* message, the projector will power up.

(PWR) Power con't

DESCRIPTION

DLV

Only values of 0, 1 or 2 as the first parameter will be recognized.

For the DLV projector the acknowledge form must be used whenever changing to boot mode or turning power on or off while in boot mode (which will end boot mode). This is because these messages cause DLV to switch between two different pieces of software. During this switch all characters that have been received are dumped & any new characters are ignored.

If the message ($pwr1) is used to turn power on the '$' acknowledge is not returned till after the warm up is complete. If the message ($pwr0) message is used to power down, the '$' is returned while the projector is still in the cool down state. This is because cool down takes 5 minutes and in all other respects the projector has powered down.

PARAMETER <No Parameter>	DESCRIPTION OF USE 0 = Off 1 = On 2 = Boot mode (for downloading new code only) **DO NOT USE** ⚠ 3 = No lamp (powered up, but lamp is off. For downloading only.) 11 = Warming up (read only)

EXAMPLES:
(PWR?) - Get projector power status.
(PWR1) - Turn the lamp and all electrical power on.
(PWR0) - Set the projector to standby mode.

(PWU) ACTIVE PIXEL WUXGA

DESCRIPTION
During a explicit selection of Auto Setup, choose which reslolution to favour and that choice is saved as a global reference.
The value is only relevant on analog sources and only on first creation of a source or an explicit call for Auto Setup (Auto key or serial commmand). **NOTE**: *WUXGA Mirage or Matrix Everest models only*

NOTE: *Defaults to 0 on non-WUXGA projectors. Defaults to 1 on WUXGA projectors.*

PARAMETER <No Parameter>	DESCRIPTION OF USE 0 = choose UXGA reslolution during Auto Setup if number of lines is 1200. i.e. 1600 pixels expected. 1 = choose WUXGA resolution i.e. 1920 pixels expected.

(PXP) PIXEL PHASE

DESCRIPTION

Use PXP to adjust the position of the sampling clock relative to the video data. Available range depends on the incoming signal, with a higher frequency source having ½ the range of a lower frequency source.

PARAMETER	DESCRIPTION OF USE
<No Parameter>	0-255(Vista), 0-23(DLV), 0-255(CoRE varies per source)

(PXT) PIXEL TRACKING

DESCRIPTION

Number of pixels/line in the image -- includes pixels in the retrace area. Range depends on the horizontal sync frequency.

PARAMETER	DESCRIPTION OF USE
<No Parameter>	

(RBL) RIGHT BLANKING

DESCRIPTION

To blank the right edge of the image (0-1000). The amount of blanking feasible depends on the incoming source data.

PARAMETER	DESCRIPTION OF USE
<No Parameter>	0-255 (Vista), 0-59 (Marquee), 0-3000 (CoRE, varies per source)

(RDB) RED BLACKLEVEL

DESCRIPTION

Set or request the red *Blacklevel* (0-511) for a specific source setup.

PARAMETER	DESCRIPTION OF USE
<No Parameter>	Range 0 to 511

(RDD) RED DRIVE

DESCRIPTION

Set or request the red *Drive* (0-511) for a specific source setup.

PARAMETER	DESCRIPTION OF USE
<No Parameter>	Range 0 to 511

(REM) REMOTE COMMANDS

DESCRIPTION

Allows arbitrary serial data to be sent out a specified port and the data can also be read from that port. It is intended to be used in conjunction with the RTE commands to allow a single event to control other equipment connected to the projector.

Before being used, a port must be configured. After configuration, the port cannot be used for standard Christie protocol commands until that port is reconfigured as a Christie port again. See tables below for setting port configuration, reading port configuration and sending and receiving arbitrary data from a port.

PARAMETER P1 = PORT	DESCRIPTION OF USE
	1 = rs232 IN
	2 = rs232 OUT
	3 = rs422 (db9)
	4 = rs422 (XLR - only some models)
	5 = rs422 (XLR - only some models)
P2 = CONFIG	r = Remote equipment c = Christie standard protocol
P3 = BAUD RATE	= same as for _(BDR) Baud Rate_ command (i.e. 96, 1152 or 115200…)
Reading the Configuration of a Port P1	= \<c\>portsame values for 'Port' as above
Sending Arbitrary Data Out a Port P1 P2	= same values for 'Port' as above = the data to send out the specified port
Reading Arbitrary Data from a Port	= same values for 'Port' as above

EXAMPLES:
Configuring a Port
(rem 2 r 96)// - configures the OUT port to send arbitrary data at 9600 baud
(rem 2 c)// - returns the OUT port to normal operation
Reading the Configuration of a Port
(rem? C2) - (REM! C002 r 0115200)
Sending Arbitrary Data Out a Port
(rem 2 "A123")// - the data A123 is sent out the OUT port without any other protocol characters.
Some codes are not standard ASCII characters. These can be sent by using any of the escape codes defined in the section on text parameters.
 (rem 2 "123\h1645) // - sends the following bytes: 0x31,0x32,0x33,0x16,0x34,0x35
Reading Arbitrary Data from a Port
(rem? 2) - (REM! 002 "1234")// 1234 is the data returned from the remote equipment

(ROG) RED ODD GAIN

DESCRIPTION
Set or request the red *Odd Gain* (0-255) for a specific source setup. You can set an Odd Gain value for two separate analog input paths. The first input path is Input 1 (BNC connectors). The second input path is one of: Input 2 (DVI-A connector), or Input 5 or Input 6 (one of the analog option cards). To leave one of the input values unaffected, enter a value of 0 for the input. If only one value is specified, then both input paths will have the same value.

PARAMETER <No Parameter>	**DESCRIPTION OF USE**

EXAMPLE:
(ROG 130 135) - Sets the BNC analog path to 130, the DVI/option card path to 135. (ROG 0 120) - Leaves the BNC path as it was, the DVI/option card path to 120. (ROG 125) - Sets both paths to 125.

(ROO) RED ODD PIXEL OFFSET

DESCRIPTION
Set or request the blue *Odd offset* (0-255) for a specific source setup. You can set an Odd Offset value for two separate analog input paths. The first input path is Input 1 (BNC connectors). The second input path is one of: Input 2 (DVI-A connector), or Input 5 or Input 6 (one of the analog option cards). To leave one of the input values unaffected, enter a value of 0 for the input. If only one value is specified, then both input paths will have the same value.

PARAMETER <No Parameter>	**DESCRIPTION OF USE**

(RTE) REAL TIME EVENTS

CONTROL GROUP: Unsaved   **SUBCLASS:** Power Down   **ACCESS LEVEL:** Operator
DESCRIPTION
Use RTE to specify actions to be initiated at a certain point in time or by an external stimulus. This action can be anything supported in the projector, as long as the action itself is not embedded within an RTE command (such as GIO input simulation and others). There are four types of RTEs: T = Timed event D = Scheduled/delayed single event G = GPIO port change S = System Status Change F = FUNC key event X = Delete event

SUBCODE See (RTE) Real Time Events con't below	**DESCRIPTION OF USE** See (RTE) Real Time Events con't below

(RTE) Real Time Events con't

IF P1 = T OR T	DESCRIPTION	MEANING
P1 = T or t	Timed event	This is a "timed" (scheduled) event
P2 – P7 = Date/Time	yyyy/MM/dd hh:mm:ss	Date and time for first occurrence
P8 = Schedule	S = Single one-time event D = Daily W = Weekly	Frequency of the event
P9 = ASCII message	Any valid ASCII command	Activity in the event

IF P1 = D OR D	DESCRIPTION	MEANING
P1 = D or d	Delayed event	This one-time event is scheduled to occur at a certain point in the future.
P2 – P4 = Amount of delay	hh:mm:ss	How long to wait before starting the event
P5 = ASCII message	Any valid serial protocol	Represents action taken during the event

IF P1 = G OR G	DESCRIPTION
P1 = G or g	GPIO port change. This is a real-time I/O event.
P2 = I/O bit	1-255, depending on hardware (in the case of masking, this represents the starting pin number).
P3 = Level	H or h = high (transition to active state) L or l = low "LHxxxHLx" combines multiple inputs and trigger occurs when all conditions are met.
P4 = Which ASCII command	Any valid serial command

(RTE) Real Time Events con't

IF P1 = S OR S	DESCRIPTION	MEANING
P1 = S or s	System event	This one-time event is scheduled for a certain point in time in the future.
P2 = Type of system event	0 = Boot 1 = Power] 2 = Error] 3 = Signal Valid 4 = Signal Bad / No Signal 5 = Signal Input Change] 6 = Signal Channel Change]] May also include P3 info (below)	Defines events internal to the hardware that can trigger command sequences.

P3 = State/details (opt.)	P3 only applies if:
	P2 = 1 (Power)
	  If P3 is 0 = Power Off
	  If P3 is 1 = Power On
	P2 = 2 (Error)
	  P3 = error number
	P2 = 5 (Signal Input)
	  P3 = Input number
	P2 = 6 (Signal Channel)
	  P3 = Channel Number
		This optional parameter further defines the state. If this is omitted, assume the event will fire on any system event of this type (for example, all signal input changes rather than a specific one)

IF P1 = F OR F	DESCRIPTION	MEANING
P1 = F or f	FUNC key event	This is a real-time event that triggers a command when the specified FUNC # is pressed.
P2 = Number key	1-5, 7-9	The number to trigger from.

IF P1 = X OR X	DESCRIPTION	MEANING
P1 = X or x	System event	This deletes a stored event.
P2 = Target	* = Delete all events d = Delete all pending events waiting because of a DLY command. Number = Delete the event with the given number from the list	This parameter determines which events will be deleted.

(RTE) Real Time Events con't
EXAMPLES:
(RTE g 7 H "(GIO 22 P 100)")
(RTE g 7 H "(GIO 22 P 100) (GIO 1 L)")
(RTE G 7 H "(GIO 22 P 100) (GIO 1 L)")
(RTE T 2003/07/09 12:36:45 S "(PWR 1)") = "S" Single / one time
(RTE T 2003/07/09 18:00:00 D "(PWR 0)") = "D" Daily
(RTE T 2003/07/09 05:00:00 W "(PWR 0)") = "W" Weekly
(RTE F 3 "(FRZ 1)") // freeze image when FUNC-3 pressed
(RTE D 00:05:00 "(PWR 0)")   = In 5 minutes, turn the projector off
(RTE G 5 H "(DLY 100) (PWR 0)") = When pin 5 goes high, delay 100ms, then power off.
(RTE?)
(RTE!000 T 2003/07/09 05:00:00 S "(PWR 0)")
(RTE!001 T 2003/07/09 12:36:45 S "(PWR 1)")
(RTE!002 T 2003/07/09 18:00:00 D "(PWR 0)")
(RTE?0)
(RTE!000 T 2003/07/09 05:00:00 S "(PWR 0)")
(RTE X 1) - delete entry one
(RTE X *) - delete all entries
(RTE X d) - delete all pending events waiting because of a (DLY) command

(SAV) SAVE CHANGES

DESCRIPTION

The projector normally saves any changes every few minutes and with every power-down. Use SAV to save changes immediately, and to retain them in the event of a power failure. The projector will save into flash memory all outstanding changes. The SAV message has no parameters.

PARAMETER	DESCRIPTION OF USE
<No Parameter>	

(SBE) SLIDEBAR ENABLE

DESCRIPTION

Use SBE to show, on (1) or hide, off (0) slidebars during use.

PARAMETER	DESCRIPTION OF USE
<No Parameter>	Show/ Hide

(SDE) SOURCE DIALOG ENABLE

DESCRIPTION

Use SDE to show (1) or hide (0) the on-screen dialog box when selecting an input using numbered keypad entry.

PARAMETER	DESCRIPTION OF USE
<No Parameter>	Show/Hide

(SHU) SHUTTER

DESCRIPTION

This control opens or closes the mechanical shutter that completely blocks all light to the screen.

PARAMETER	DESCRIPTION OF USE
<No Parameter>	0 = Open 1 = Close

EXAMPLES:
(SHU 1) - Close the shutter.
(SHU?) - Get the shutter position.

(SIN) SELECT INPUT

DESCRIPTION

Use SIN to switch to a specific input.

PARAMETER	DESCRIPTION OF USE
	1 = BNC
	2 = DVI-I
	3 = Composite
	4 = S-Video
	5 = Option slot #1
	6 = Option slot #2
	7 = Option slot #1 – its secondary input if present
	8 = Option slot #2 – its secondary input if present

(SIZ) SIZE

DESCRIPTION

Use SIZ to control image width and height in tandem, maintaining the incoming aspect ratio (1000 = no resizing).

PARAMETER	DESCRIPTION OF USE
<No Parameter>	Set the size for the main image.

(SOR) SCREEN ORIENTATION

DESCRIPTION

Selects the orientation of the displayed image. It can be displayed normally, inverted horizontally, inverted vertically, or inverted in both directions, as required by the projector installation.

PARAMETER	DESCRIPTION OF USE
<No Parameter>	0 = Front Projection 1 = Rear Projection 2 = Front Projection Inverted 3 = Rear Projection Inverted

(SPS) SPLASH SELECT

DESCRIPTION

Use SPS to select when to display the splash screen.

PARAMETER	DESCRIPTION OF USE
<No Parameter>	0 = Always off 1 = Startup only 2 = Startup and when there is no Signal (default) 3 = Always on

(SRC) SELECT SOURCE

DESCRIPTION

Get a list of serial ports available on the device.

SUBCODE	DESCRIPTION OF USE
<No Subcode>	

EXAMPLE:
(PRT?1) - Get list of ports.

(SST) SYSTEM STATUS

DESCRIPTION

Use SST to find out a variety of information about the current state of the projector. The single broad-ranging request (SST?) for *all* information triggers the return of a series of replies as if multiple requests had been sent. In each of these status replies, P1 explains the general content or topic in the reply, and P2 the individual details. To obtain status regarding one topic only, specify the desired P1parameter corresponding to that topic in your request—for example, the request (SST?0) will trigger general projector information only. For a specific single-status inquiry, include both P1 and P2 in the request—for example, (SST?4 2) asks whether the lamp door is open or closed. Thus you can use the SST *request* command in 3 ways:

(SST?) returns all results along with descriptive text/data. The specifics within each of the five status groups will vary from model to model (*Roadster* vs. *DS+60* vs. *Roadie 25K*, etc., etc.) and be affected by options installed, software versions and other factors, thus a general SST inquiry is a good way to establish exactly what status reports are available for your projector.

(SST) System Status con't

(SST? X) where X = which *Status Group* 0-4 (P1). This request obtains all results that belong to this status group.

(SST? X Y) where X = which *Status Group* 0-4 (P1), and Y= which *Detail* 0-varies (P2). This request obtains information pertaining specifically to a certain module or condition.

For all projectors mentioned in .

PARAMETER P1 = STATUS GROUP	DESCRIPTION OF USE
	0 = General Projector Model Information – model, serial#, resolution, factory settings, etc.
	1 = System Status – power on/off, lamp, hours of use, shutter, OSD, etc.
	2 = Signal Information – source frequency, channel#, switching, etc.
	3 = Operation Status – errors, temperatures, and interlocks
	4 = Versions – h/w versions, s/w versions, h/w serial numbers, optional modules.

(STD) VIDEO STANDARD

DESCRIPTION

Use STD to select the video standard to use with the video input. If "auto" is selected (8) the projector will automatically find the correct standard. If a request for standard is made and the standard has been set to "auto" the return value will be preceded with an 'A'.

PARAMETER <No Parameter>	DESCRIPTION OF USE
	0 = PAL
	1 = NTSC
	2 = SECAM
	3 = NTSC4.43 Was NTSC4
	4 = PAL-M
	5 = PAL-NC
	6 = PAL-60
	7 = NTSC
	8 = Auto-select
	NOTE: *The numbers associated with a standard in this list have no relation to the standard's on-screen menu position.*

(SZP) SIZE PRESETS POSITION

DESCRIPTION

Use SZP to resize the image based on preset methods. Any value other than "1" shows *Custom* in the menu. Note:

(SZP) Size Presets Position con't

PARAMETER \<No Parameter>	DESCRIPTION OF USE
	When set to default (0), a reading from the projector will identify the current default setting.
	0 = Default
	1 = No Resizing
	2 = Full Screen
	3 = Full Width
	4 = Full Height
	5 = Anamorphic
	6 = Custom resizing (read only)

EXAMPLES:
(SZP 1) - Set the size preset to no resizing.

(TBL) TOP BLANKING

DESCRIPTION
Use TBL to blank (turn to black) the top of the image. Range depends on the source.

PARAMETER \<No Parameter>	DESCRIPTION OF USE

(TDA) 3D ACTIVATE

DESCRIPTION

NOTE: *This selection is only necessary when using projectors that are HD (1920x1080) resolution.*

TDA tells the light engine to interpret the incoming source as 3D or not 3D.

PARAMETERS \<No Parameters>	DESCRIPTION OF USE
	0 = Off Light engine will not handle the incoming source as 3D 1 = On Light engine handles incoming source as being 3D

(TDD) 3D DELAY

DESCRIPTION

NOTE: *For **Mirage** with 3D Stereo Sync cable only.*

TDD specifies how long to delay the beginning of the right-left eye signal. The *Mirage 3D Stereo Sync Cable* MUST be attached to the GPIO port, and a 3D input must be selected (TDS command). The output signal is always synchronized to the projector's output vertical sync pulse prior to applying the delay. See *(TDS) 3D Stereo Sync Select* and the projector's *User Manual* for details.

PARAMETERS \<No Parameters>	DESCRIPTION OF USE

(TDI) 3D STEREO SYNC INPUT

DESCRIPTION

NOTE: *For Mirage HD only.*

Select source for 3D Sync Input

PARAMETER	DESCRIPTION OF USE
\<No Parameter\>	0=Input A
	1=Input A Inverted
	2=Input B
	3=Input B Inverted
	4=Internal (default)
	5=Internal Inverted

(TDM) 3D STEREO SYNC MODE

DESCRIPTION

NOTE: *For **Mirage** with 3D Stereo Sync cable only.*

TDM specifies how the incoming stereo signal is synchronized.

PARAMETER	DESCRIPTION OF USE
\<No Parameter\>	0 = Off No cable present 1 = Output 3D delay is synchronized with (locked to) the projector's vertical sync output 2 = Output Inverted Reverse L/R frames. Use only if frame delay = 1 or 3 3 = Input 3D delay is synchronized with (locked to) the incoming input signal 4 = Input Inverted Reverse L/R frames. Use only if frame delay = 1 or 3

(TDO) 3D STEREO SYNC OUTPUT

DESCRIPTION

NOTE: *For Mirage HD only.*

Send the 3D Stereo Sync Output either off, to the 3D glasses, or to the next projector.

(TDO) 3D Stereo Sync Output con't	
PARAMETER <No Parameter>	**DESCRIPTION OF USE** 0=Off 1=To Emitter (default) 2=To Emitter Inverted 3=To Next 4=To Next Inverted

(TDS) 3D STEREO SYNC SELECT	
DESCRIPTION	
NOTE: *For **Mirage** with 3D Stereo Sync cable only.* TDS Selects which input to use for the R/L eye signal. The cable has right-left eye signals on 2 inputs and 1 output. The active input is selectable. See the *User Manual* for details.	
PARAMETER <No Parameter>	**DESCRIPTION OF USE** 0 = A input 1 = B input

(TMD) TIME/DATE	
DESCRIPTION	
TMD sets the time & date in the projector's Real Time Clock.	
PARAMETER	**DESCRIPTION OF USE** Set the date in the form yyyy/mm/dd. **P1** = Year (####, such as 2005) **P2** = Month (1= Jan., 2 = Feb., etc.) **P3** = Date (1-31) **P4** = Hour (0-23, 24-hr. clock) **P5** = Minute (0-59) **P6** = Second (0-59)
EXAMPLES: (TMD!2004/08/13 14:21:00) = August 13, 2004 at 2:21 pm (TMD!2005/02/03 08:12:00) = February 3, 2005 at 8:12 am	

(TNT) TINT	
DESCRIPTION	
TNT sets the tint for video images. The TNT value represents a percentage, e.g. 1000=100.0% or 0505=50.5%.	
PARAMETER <No Parameter>	**DESCRIPTION OF USE**

(USR) USER MESSAGE

DESCRIPTION

Use USR to load a user message for display in the *Status* menu. Use the form (USR<text>) following the structure outlined in the following table to set the desired text to be displayed.

PARAMETER P1 = TEXT	DESCRIPTION OF USE
	The text may contain the following special characters (all characters 0-255 that are not in this list may be included in the text directly): \n = new line \\ = backslash \" = quote \(= left bracket \) = right bracket \b = 0x01 control code (beginning of message) \e = 0x0E control code (end of message) \s = 0x13 control code (Xoff) \g = 0x11 control code (Xon) \c = 0x1B control code (ESC) The last entries in the table are control codes that will not appear in a status page message -- they are listed here for completeness because the same text format is used to save and restore source data as well as to download code. **NOTE:** *When a request is made to retrieve the user message that has already been set, the returned value is displayed in the same format as setting the text.*

EXAMPLES:

(usr"hello world") - basic user message.

(usr"hello world\nline two") - message with new line in the middle.

(usr"Contact \"freddy\" for help") - message with embedded quote.

Refer to *2.1 Basic Message Structure* for text parameters.

(VBL) VIDEO BLACK LEVEL

DESCRIPTION

Use VBL to set black levels to 0 IRE (0) or 1 (7.5 IRE) for video signals. Most NTSC standards include a 7.5IRE "Setup" to the video black level. By adjusting this setting the projector can be optimized for incoming data with or without this "Setup". If it is set wrong the image will have elevated blacks or crushed blacks.

PARAMETER <No Parameter>	DESCRIPTION OF USE

(VRT) VERTICAL POSITION

DESCRIPTION

This control sets the vertical position of the image.

PARAMETER	DESCRIPTION OF USE
<No Parameter>	Set the vertical position for the main image.

(VST) VERTICAL STRETCH

DESCRIPTION

Use VST to electronically stretch the image vertically (200-4000) without affecting the horizontal size. 1000 is the neutral position (no stretching).

PARAMETER	DESCRIPTION OF USE
<No Parameter>	Set the vertical stretch for the main image.

(WBT) WHITE BOOST

DESCRIPTION

NOTE: *For single-chip projectors such as* **DS+60** *and* **Matrix 3000** *only.*

Use WBT to adjust the white boost value (1-10) or turn white boost off (0). Boosting can change whites that are nearly full white to become full white. Default video WBT is 2; default graphics WBT is 10.

PARAMETER	DESCRIPTION OF USE
<No Parameter>	Set the vertical position for the main image.

EXAMPLES:
(VRT 500) - Set vertical position to 500 on main video.
(VRT?) - Returns the vertical position value on main video.

(WFH) WARP PREFILTER H

DESCRIPTION

Use WFH to set or request the warp horizontal pre-filter. Requires *Christie TWIST™* module.

PARAMETER	DESCRIPTION OF USE
<No Parameter>	

(WFV) WARP PREFILTER V

DESCRIPTION
Use WFH to set or request the warp vertical pre-filter. Requires *Christie TWIST™* module

PARAMETER	DESCRIPTION OF USE
<No Parameter>	

(WKC) 2D KEYSTONE CORNERS

DESCRIPTION

NOTE: *Requires **Christie TWIST™** module.*

Use WKC to set or request the x/y coordinates for the four corners defining "2D keystone", i.e. a 4-sided image shape.

Any coordinate value that is ½ that of the native resolution of the projector defines a "normal" location (i.e., no warping). For example, in a projector with 1400 x 1050 resolution, any "x" value of 700 is normal. A value over 700 moves a corner to the right; a value below 700 moves a corner to the left. A value of 0 moves a corner as far from center as possible (which may be off the screen). You can move a point towards center by a distance that is ¼ of the full resolution—for example, you can move the top left point to the right by a maximum distance of 350 pixels, which is ¼ of the total 1400 pixels available.

PARAMETER P1	DESCRIPTION OF USE = index of the position to set or request
P2	= value to set if it is a set command
	The valid indices are as follows, each with a range that depends on the resolution of the projector you are working with: 1 = Top Left Corner – Horizontal Position (x) 2 = Top Left Corner – Vertical Position (y) 3 = Top Right Corner – Horizontal Position (x) 4 = Top Right Corner – Vertical Position (y) 5 = Bottom Left Corner – Horizontal Position (x) 6 = Bottom Left Corner – Vertical Position (y) 7 = Bottom Right Corner – Horizontal Position (x) 8 = Bottom Right Corner – Vertical Position (y)

(WPL) WARP LATENCY

DESCRIPTION
Use WPL to set or request the warp latency. Requires *ChristieTWIST™* module.

PARAMETER <No Parameter>	DESCRIPTION OF USE

(WPS) WARP SELECT

DESCRIPTION

Use WPS to select which warp map to use, or to disable warping. Requires *Christie TWIST™* module.

PARAMETER <No Parameter>	DESCRIPTION OF USE 0 = Disable 1 = 2D Keystone 2-4 = User-defined maps

![Christie logo]

(WSH) WARP SHARPNESS

DESCRIPTION
Set or request the warp sharpness.

PARAMETER	DESCRIPTION OF USE
<No Parameter>	

(XAR) XPORT ARTNET SETTINGS

DESCRIPTION
This control sets the vertical position of the image.
It is also possible to access individual parameters using these indices:

Index	Value Range	Description
0	0-1	ArtNET mode (small/full implementation)
1	0-15	ArtNET subnet (not the same as subnet mask)
2	0-15	ArtNET universe
3	1-503	ArtNET channel
4	18 characters	ArtNET device name
5	44 characters	ArtNET device description/long name

PARAMETER	DESCRIPTION OF USE
P1	= ArtNET mode (0-1) 0 = Small (10 channel)/1 = full (64 channel) implementation
P2	= ArtNET Subnet (0-15) ArtNET (not the same as subnet mask)
P3	= ArtNET Universe (0-15) DMX universe
P4	= ArtNET Channel (1-503) Base DMX channel for communications
P5	= ArtNET Device Name Identifiable name (18 characters)
P6	= ArtNET Device Description Description or long name (44 characters) <optional>

EXAMPLES:

(XAR?) - Request ArtNet settings.

Above request returns (XAR!000 000 005 00300 "Christie" "Projector 5") - Small mode, subnet 0, universe 5, channels 300-309.

(XAR 1 0 5 65 "Projector 1"): Set to full mode, subnet 0, universe 5, channels 65-127, name "Projector 1". (XAR 1 0 5 65 "Christie" "Projector 1") - Set to full mode, subnet 0, universe 5, channels 65-127, name "Christie", description "Projector 1".

(XAR) XPort ArtNet Settings con't

The following table indicates how individual parameters for ArtNet settings can also be accessed using the form (XAR? I<index>) for a specific request and (XAR I<index> <value>) to set individual parameters.

(XAR?4) - Request the Device Name.

(XAR I3 47) - Set the base or starting channel to 47.

(XAR I5 "Projector 5: bottom left corner") - Set the description to "Projector 5: bottom left corner".

(XIP) XPORT IP

DESCRIPTION

Set or request the IP address, Port, Subnet Mask, Gateway IP and Network Name (the port is optional in a set message). A reply shows the parameters, separated by a colon and followed by a flag which indicates if this address was assigned by a DHCP server (1) or whether it is a static address (0) defined manually by a user or administrator. This first method outlines how to access IP address and Port information only.

P1 = IP address and/or port, separated by a colon.

Flag = Shows if DHCP is enabled (1) or disabled (0).

To enable DHCP (so that a DHCP server automatically assigns a valid address), use XIP to set the IP address to 0.0.0.0.

XIP can also be used in accordance with the following table to set and request information in the form (XIP? I<index>) for a request and (XIP I<index> <value>) to set (this is the only way to access the Subnet Mask, Gateway and Network Name if desired):

Index	Value Range	Description
0	a.b.c.d	IP address
1	1-32767	Port
2	0-1	DHCP enable
3	a.b.c.d	Subnet Mask
4	a.b.c.d	Default Gateway
5	32 characters	DNS Name

PARAMETER	DESCRIPTION OF USE
<No Parameter>	Set the vertical position for the main image.

EXAMPLES:

(XIP?) - Request the IP and port on the device.   Previous request returns (XIP!192.168.001.100:10001 00001): The projector's IP address is 192.168.001.100, it's port is 10001, and this address has been assigned by a DHCP server.

(XIP192.168.1.100:3002) - Set the IP on the device to 192.168.1.100 and the port to 3002

(XIP192.168.1.100) - Set the IP on the device to 192.168.1.100. Do not change the port.

(XIP0.0.0.0) - Set projector's address to 0.0.0.0 so that a DHCP server will assign a valid address. Do not change the port.

(XIP I0 192.168.0.1) - Set the IP address to 192.168.0.1.

(XIP I2 1) - Explicitly set DHCP mode to on. This will override any previously set IP address.

(XIP I3 255.255.255.0) - Set the Subnet Mask to 255.255.255.0.

(XIP I5 "Projector4") - Set the Network Name to "Projector4".

CHRISTIE

(ZOM) ZOOM

DESCRIPTION

Change the zoom setting of the lens under motor control.

Non-ILS projectors

The value is not stored. Key emulation is used to change the settings (see the Key Emulation Section of this document).

ILS projectors

The value is stored for each saved channel, however the key emulation continues to be supported as described above. A channel value can be changed by the following command:

Modifier	Parameter 1	Parameter2	Description
S	P1 = channel number	P2=position (0-9999)	Set source to value and move if currently active
M	P1 = channel number	Not used	Return min/max for control
	P1 = position	Not used	Move current channel to this position

Entering a position will also cause movement to that position when ILS is turned on.

NOTICE: *This command will take some time to complete. Repeated commands must allow sufficient time for the previous movement to complete; hence it is not suitable for frequent or continuous lens positioning using ILS. Please refer to the LDM command for this functionality.*

PARAMETER (see ILS projectors above)	DESCRIPTION OF USE (see ILS projectors above)

EXAMPLE:

(ZOM K0)   Stop Zoom Movement, Lens will not stop until this command is issued or the end stop is reached.

(ZOM K2)   +ve Zoom Direction.

(ZOM K3)   -ve Zoom Direction.

NOTE: To "nudge" the zoom a minimum amount, script in a delay between (ZOM K3) and (ZOM K0). Depending on your application, a delay of at least 20-30 milliseconds may be sufficient.

(ZOM S1 4000)Set zoom for channel 1 to 4000 and, if channel 1 is active source, move to this position

(ZOM? S1)Return the position for channel 1: (ZOM! 0001 04000)

(ZOM? M1)Return min max values for channel 1: (ZOM? 00000 09999)

(ZOM 4000)Set zoom of current channel to 4000 and move to this position