CHRISTIE

E Series Serial Commands Technical Reference Information

INTRODUCTION

This document describes the serial protocol, consisting of ASCII text messages, used to control the E Series projectors.

CONNECTION AND USE

Once you have connected your computer to either the RS232 IN port or to the ETHERNET port on a projector, you can remotely access projector controls and image setups, issue commands or queries, and receive replies.

Setting up RS232 communication

Connect the projector and host using a null standard cable with 9-pin female to the host, and 9-pin female to the projector. Pin 2 connects to pin 3, pin 3 connects to pin 2 and pin 5 connects to pin 5.

RS232 Communication parameters

Supported RS232 settings:

PARAMETER	DATA
Baud Rate Default	115200
Parity	None
Data Bits	8
Stop Bits	1
Flow Control	None

NOTE: *Use direct connections from laptops and desktops. Docking ports of certain laptops have had issues with software upgrades*

MESSAGE FORMAT

1. For all commands, a space may be entered between the code and the number. Example (PXT50), without a space, can also be entered as (PXT 50), with a space. Both are valid.
2. A modifier can be added to some commands to allow the value to be incremented or decremented, without having to enter an absolute value. Modifier “n” goes to “next value” and modifier “p” goes to “previous value”.

   For example: The OVS Overscan command allows the values:

   (OVS0) : OFF

   (OVS1) : ZOOM

   (OVS2) : CROP

   If the current setting is “Off”, then after (OVS n) is processed, the value will be set to “Zoom”. If the current setting is “Crop”, then after (OVS p) is processed, the value will be set to “Zoom”.

Messages can be one of three types:

- Set - A command to set a projector parameter at a specific level, such as changing the brightness.
- Request - A request for information, such as what is the current brightness setting.
- Reply - The projector returns the data in response to a request or as confirmation of a command.

All “remote control” information passes in and out of the projector as a simple text message consisting of a three letter command code, an optional four letter subcode and any related data. Optional features (message acknowledges) can be included. Regardless of message type or origin, all messages use the same basic format outlined in *Table 1 Message Formats*.

Table 1 Message Formats

SOURCE	MESSAGE FORMAT	FUNCTION	EXAMPLES
From Controller	(Code Data)	SET (set contrast to 50)	(CON500) or (CON 500)
	(Code+Subcode Data)	SET (set source 1 name to “VGA BOX 1”)	(SNS+SRC1 “VGA BOX 1”)
From Controller	(Code ?)	REQUEST (what is current contrast?)	(CON?) or (CON ?)
	(Code+Subcode ?)	REQUEST (what is lamp 1 hours?)	(LIF+LP1H?)
From Projector	(Code Data)	REPLY (contrast is 50)	(CON!50)
	(Code+Subcode Data)	REPLY (LMP 1 HOURS IS 534)	(LIF+LP1H!534)

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 italics, with the exception of Notes.

- **START AND END OF MESSAGE:** Every message begins with the left “(“character and ends with the right “)“character. NOTE: *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 a special character before the 3-character function code: # - Full Acknowledgment, which will cause an echo of the message as a reply to be sent back from the projector

when it has finished processing the message. 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.

- **FUNCTION CODE:** The projector function you wish to work with, such as contrast, 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 that do not have a subcode, a space between the function code and the first parameter (or special character) is optional.
- **+SUBCODE:** The projector function you wish to work with may have one or more subcodes that will allow you to select a specific source or subfunction. The subcode is represented by a four-character ASCII code (A-Z, upper or lower case, and 0-9). This subcode appears immediately after the function code, with a "+" character to separate the code and subcode. If there is no subcode, the "+" is also omitted. In messages sent to the projector that do have a subcode, a space between the subcode and the first parameter (or special character) is optional.
- R**EQUEST/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 — data directly follows the code and subcode.

MESSAGE ERRORS

If a command cannot be performed (e.g. syntax error), you will receive a descriptive error indicating the problem. For example: (ITP) - (65535 00000 ERR00005 "ITP: Too Few Parameters")

TABLE OF CONTENTS

SIZE & POSITION COMMANDS

(SZP) SIZE PRESETS	READ/WRITE: R/W
SUBCODE <No Sub code> Allows modifiers “n” and “p” for selecting “next” and “previous” values.	
DESCRIPTION OF USE Scales the input image to a set of predefined aspect ratios. Default value is ‘Auto’.	
EXAMPLES: (SZP0) : Auto (SZP1) : Native (SZP2) : 4:3 (SZP3) : LetterBox (SZP4) : Full Size (SZP5) : Full Width (SZP6) : Full Height	

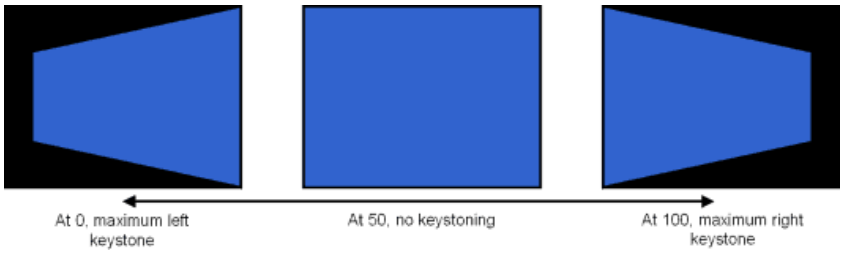
(OVS) OVER SCAN	READ/WRITE: R/W
SUBCODE <No Sub code> Allows modifiers “n” and “p” for selecting “next” and “previous” values.	
DESCRIPTION OF USE Controls how edges of the input image are framed.	
EXAMPLES: (OVS0) : OFF (OVS1) : ZOOM (OVS2) : CROP	

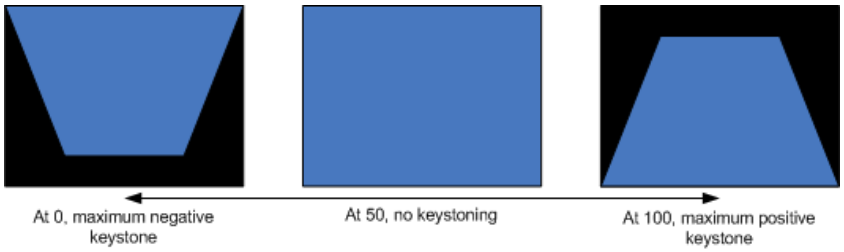
(PXP) PIXEL PHASE	READ/WRITE: R/W
SUBCODE <No Sub code>	
DESCRIPTION OF USE Adjusts the phase of the pixel clock created for analog inputs in the range 0 to100. Default value is 50.	
EXAMPLES: (PXP50)	

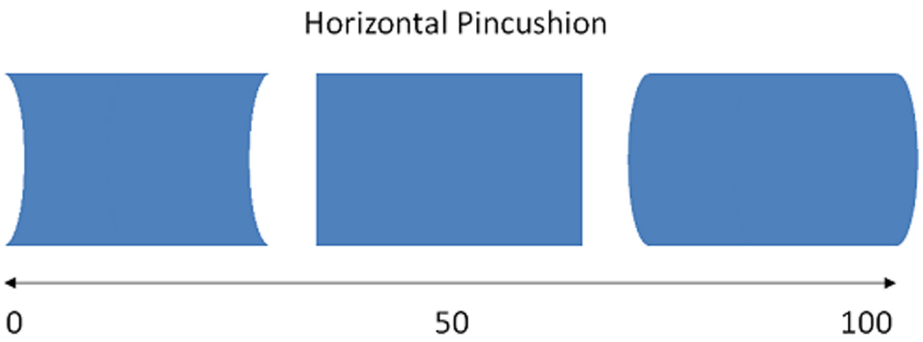
(PXT) PIXEL TRACK	READ/WRITE: R/W
SUBCODE <No Sub code>	
DESCRIPTION OF USE Adjusts the number of pixel clocks per horizontal sync in the range 0-100. Default value is 50.	
EXAMPLES: (PXT50)	

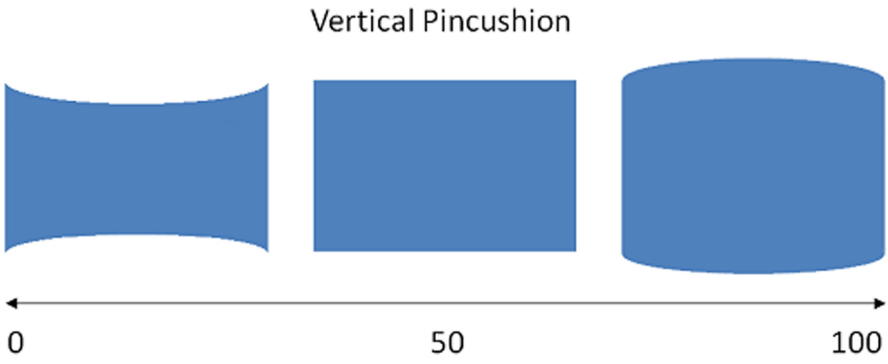
(HOR) HORZ POSITION	READ/WRITE: R/W
SUBCODE <No Sub code>	
DESCRIPTION OF USE Moves the starting point of the input capture. When applying this function, some of the active area will be blanked. Increasing the value moves the active image to the right. Valid range is 0 to 100. Default value is 50.	
EXAMPLES: (HOR50)	

(VRT) VERT POSITION	READ/WRITE: R/W
SUBCODE <No Sub code>	
DESCRIPTION OF USE Moves the starting point of the input capture. When applying this function, some of the active area will be blanked. Increasing the value moves the active region up. Valid range is 0 to 100. Default value is 50.	
EXAMPLES: (VRT50)	

(WRP+HKST) HORZ KEYSTONE	READ/WRITE: R/W
SUBCODE HKST	
DESCRIPTION OF USE Horizontal keystone : corrects the distortion created when the projected image is to the left or right of the lens axis and increasing this value increases right keystoning:  Valid range is 0 to 100. Default value is 50.	
EXAMPLES: (WRP+HKST 50)	

(WRP+VKST) VERT KEYSTONE	READ/WRITE: R/W
SUBCODE VKST	
DESCRIPTION OF USE Vertical keystone corrects the distortion created when the projected image is above or below the lens axis, and increasing this value increases positive keystoning:  Valid range is 0 to 100. Default value is 50.	
EXAMPLES: (WRP+VKST 50)	

(HPC) HORZONTAL PINCUSHION	READ/WRITE: R/W
SUBCODE <No Sub code>	
DESCRIPTION OF USE Horizontal pincushion adjusts horizontal distortion. Valid range is 0 to 100. Default value is 50.  .	
EXAMPLES: (HPC50)	

(VPC) VERTICAL PINCUSHION	READ/WRITE: R/W
SUBCODE <No Sub code>	
DESCRIPTION OF USE Vertical pincushion adjusts vertical distortion. Valid range is 0 to 100. Default value is 50.  .	
EXAMPLES: (VPC50)	

(SIZ) DIGITAL ZOOM	READ/WRITE: R/W
SUBCODE <No Sub code>	
DESCRIPTION OF USE Valid range is 0-100: 100 for normal (unchanged) display area size - if there are any black borders around edges of the display area, they are as small as possible (Default). 0 for display area reduced as small as possible – there will be large black borders around the edges of the displayed image.	
EXAMPLES: (SIZ100)	

(DSH) DIGITAL HORZ SHIFT	READ/WRITE: R/W
SUBCODE <No Sub code>	
DESCRIPTION OF USE Valid range for horizontal position is 0 to 100: At 0 the display area is moved as far as possible to the left, at 50 the display area is horizontally centered, and at 100 the display area is moved as far as possible to the right. The image must be "zoomed out" (Digital Zoom) before this function can be used. "Digital Horz Shift" will be disabled if Digital Zoom has not been applied. Default value is 50.	
EXAMPLES: (DSH50)	

(DSV) DIGITAL VERT SHIFT	READ/WRITE: WRITE ONLY
SUBCODE <No Sub code>	
DESCRIPTION OF USE Valid range for vertical position is 0 to 100: At 0 the display area is moved as far as possible to the top, at 50 the display area is vertically centered, and at 100 the display area is moved as far as possible to the bottom. The image must be “zoomed out” (Digital Zoom) before this function can be used. “Digital Horz Shift” will be disabled if Digital Zoom has not been applied. Default value is 50.	
EXAMPLES: (DSV50)	

(AIM) AUTO IMAGE	READ/WRITE: WRITE ONLY
SUBCODE <No Sub code>	
DESCRIPTION OF USE Forces the projector to reacquire and lock to the input signal. This is useful when signal quality is marginal.	
EXAMPLES: (AIM1)	

IMAGE SETTING COMMANDS

(BRT) BRIGHTNESS	READ/WRITE: R/W
SUBCODE <No Sub code>	
DESCRIPTION OF USE Adjusts the overall black level of the projected image by applying an offset to the input image. Valid range is 0 to 100. Default value is 50.	
EXAMPLES: (BRT50)	

(CON) CONTRAST	READ/WRITE: R/W
SUBCODE <No Sub code>	
DESCRIPTION OF USE Adjusts the overall white level of the projected image by applying a gain to the input image. Valid range is 0 to 100. Default value is 50.	
EXAMPLES: (CON50)	

(CSP) COLOR SPACE	READ/WRITE: R/W
SUBCODE <No Sub code> Allows modifiers “n” and “p” for selecting “next” and “previous” values.	
DESCRIPTION OF USE Sets the color space of the input signal. Default value is ‘Auto’.	
EXAMPLES: (CSP0) : RGB (CSP1) : REC709 (CSP2) : REC601 (CSP3) : RGB Video (CSP4) : Auto	

(DTL) DETAIL	READ/WRITE: R/W
SUBCODE <No Sub code> Allows modifiers “n” and “p” for selecting “next” and “previous” values.	
DESCRIPTION OF USE Applies a predefined sharpness setting to the current input signal. This adjusts the overall detail of the projected image. Default value is ‘Normal’.	
EXAMPLES: (DTL0) : Maximum (DTL1) : High (DTL2) : Normal (DTL3) : Low (DTL4) : Minimum	

(CLR) COLOR	READ/WRITE: R/W
SUBCODE <No Sub code>	
DESCRIPTION OF USE Adjusts the color saturation of analog video sources. Valid range is 0 to 100. Default value is 50.	
EXAMPLES: (CLR50)	

(TNT) TINT	READ/WRITE: R/W
SUBCODE <No Sub code>	
DESCRIPTION OF USE Adjusts the red/green balance of analog video NTSC sources. Valid range is 0 to 100. Default value is 50.	
EXAMPLES: (TNT50)	

(NRD) NOISE REDUCTION	READ/WRITE: R/W
SUBCODE <No Sub code>	
DESCRIPTION OF USE Reduces temporal and/or spatial noise in the image. Valid range is 0 to 100. Default value is 0.	
EXAMPLES: (NRD50)	

(FTC) FLESH TONE CORRECTION	READ/WRITE: R/W
SUBCODE <No Sub code>	
DESCRIPTION OF USE Controls the amount of flesh tone correction applied to the image. Valid range is 0 to 100. Default value is 0.	
EXAMPLES: (FTC50)	

(VBL) VIDEO BLACK LEVEL	READ/WRITE: R/W
SUBCODE <No Sub code> Allows modifiers “n” and “p” for selecting “next” and “previous” values	
DESCRIPTION OF USE When ‘On’, the projector will analyze the current input image and calculate an offset value which is then added to the Analog to Digital converter black level value. This ensures optimum black level for each analog source.	
EXAMPLES: (VBL0) : IRE off. (VBL1) : IRE on.	

(FMD) DETECT FILM	READ/WRITE: R/W
SUBCODE <No Sub code> Allows modifiers “n” and “p” for selecting “next” and “previous” values.	
DESCRIPTION OF USE Controls film mode detection. This determines whether the original source of the input video was film(progressive) or video (interlaced), by analyzing motion in the video. This information allows the projector to correctly display fields from interlaced sources. Default value is ‘On’.	
EXAMPLES: (FMD0) : Detect film OFF (FMD1) : Detect film ON	

(CLC) CLOSED CAPTIONS	READ/WRITE: R/W
SUBCODE <No Sub code> Allows modifiers “n” and “p” for selecting “next” and “previous” values.	
DESCRIPTION OF USE Controls closed caption display while audio is muted. Default value is ‘Off’.	
EXAMPLES: (CLC0) : off (CLC1) : CC1 (CLC2) : CC2	

(ROG) RED GAIN	READ/WRITE: R/W
SUBCODE <No Sub code>	
DESCRIPTION OF USE Valid range is 0 to 100. Default value is 50.	
EXAMPLES: (ROG50)	

(GOG) GREEN GAIN	READ/WRITE: R/W
SUBCODE <No Sub code>	
DESCRIPTION OF USE Valid range is 0 to 100. Default value is 50.	
EXAMPLES: (GOG50)	

(BOG) BLUE GAIN	READ/WRITE: R/W
SUBCODE <No Sub code>	
DESCRIPTION OF USE Valid range is 0 to 100. Default value is 50.	
EXAMPLES: (BOG50)	

(ROO) RED OFFSET	READ/WRITE: R/W
SUBCODE <No Sub code>	
DESCRIPTION OF USE Valid range is 0 to 100. Default value is 50.	
EXAMPLES: (ROO50)	

(GOO) GREEN OFFSET	READ/WRITE: R/W
SUBCODE <No Sub code>	
DESCRIPTION OF USE Valid range is 0 to 100. Default value is 50.	
EXAMPLES: (GOO50)	

(BOO) BLUE OFFSET	READ/WRITE: R/W
SUBCODE <No Sub code>	
DESCRIPTION OF USE Valid range is 0 to 100. Default value is 50.	
EXAMPLES: (BOO50)	

(SYT) SYNC THRESHOLD	READ/WRITE: R/W
SUBCODE <No Sub code>	
DESCRIPTION OF USE Adjusts the sync threshold for sync-on-green (SOG) signals. This controls the voltage at which a negative pulse is determined to be a sync instead of active video. The setting is needed anytime the active video source places its sync on the green/luma channel. Valid range is 0 to 100. Default is 50.	
EXAMPLES: (SYT50)	

(GOR) RGB GAIN/OFFSET RESET	READ/WRITE: R/W
SUBCODE <No Sub code>	
DESCRIPTION OF USE Reset the Red, Green and Blue gain and offset values.	
EXAMPLES: (GOR1): Reset RGB Gain/Offset settings.	

(PST) PICTURE SETTING	READ/WRITE: R/W
SUBCODE <No Sub code>: Set picture setting USER : Store currentl settings to User Mode. Allows modifiers “n” and “p” for selecting “next” and “previous” values.	
DESCRIPTION OF USE Changing this setting updates values of picture-related settings (for the current source only) to a set of predefined values.	
EXAMPLES: (PST0) : Presentation (PST1) : Video (PST2) : Bright (PST3) : Whiteboard (PST4) : Blackboard (PST5) : Beige Wall (PST6) : User (PST+USER1) : Store currently settings to User Mode.	

(DIM) DYNAMICBLACK	READ/WRITE: R/W
SUBCODE <No Sub code> Allows modifiers “n” and “p” for selecting “next” and “previous” values	
DESCRIPTION OF USE When switched ‘On’, the aperture will constantly adjust based on the amount of black in the current scene.	
EXAMPLES: (DIM0) : DynamicBlack off. (DIM1) : DynamicBlack on.	

(BGC) GAMMA CURVE	READ/WRITE: R/W
SUBCODE <No Sub code> Allows modifiers “n” and “p” for selecting “next” and “previous” values.	
DESCRIPTION OF USE Selects gamma correction curve.	
EXAMPLES: (BGC0) : Video (BGC1) : Film (BGC2) : Bright (BGC3) : CRT	

(BCL) BRILLIANTCOLOR	READ/WRITE: R/W
SUBCODE <No Sub code>	
DESCRIPTION OF USE Increases image brightness but reduces overall color accuracy.	
EXAMPLES: (BCL0) : Normal Look (BCL1) : Bright Look Want to be able to adjust from 1 to 10, and 0 will be off or Normal look Coretronics comments: Technically, we could use HSG function by adjusting “White gain” and it can set 10 level or 5 level depends on request. But we still need to have more discussion to make sure what kind of performance need to achieve.	

(WPK) WHITE PEAKING	READ/WRITE: R/W
SUBCODE <No Sub code>	
DESCRIPTION OF USE Adjusts the amount of white processing through the data path.	
EXAMPLES: (WPK50)	

(CCI) COLOR TEMPERATURE	READ/WRITE: R/W
SUBCODE <No Sub code> Allows modifiers “n” and “p” for selecting “next” and “previous” values.	
DESCRIPTION OF USE Applies a predefined color temperature to the input signal	
EXAMPLES: (CCI0) : Warmest (CCI1) : Warm (CCI2) : Cool (CCI3) : Bright	

(EDG) EDGE ENHANCEMENT	READ/WRITE: R/W
SUBCODE <No Sub code> Allows modifiers “n” and “p” for selecting “next” and “previous” values	
DESCRIPTION OF USE Apply edge enhancement.	
EXAMPLES: (EDG0): off. (EDG1): normal. (EDG2): Maximum.	

(CWS) COLOR WHEEL SPEED	READ/WRITE: R/W
SUBCODE <No Sub code> Allows modifiers “n” and “p” for selecting “next” and “previous” values.	
DESCRIPTION OF USE Setting Color Wheel speed to 2 x or 3x setting.	
EXAMPLES: (CWS0) : Set Color Wheel speed to 2x setting. (CWS1) : Set Color Wheel speed to 3x setting.	

CONFIGURATION COMMANDS

(LOC) LOCAL SETTINGS	READ/WRITE: R/W
SUBCODE LANG – Language Allows modifiers “n” and “p” for selecting “next” and “previous” values.	
DESCRIPTION OF USE Controls which language to display in the OSD.	
EXAMPLES: (LOC+LANG 0) – set the language to English (LOC+LANG 1) – set the language to Chinese (LOC+LANG 2) – set the language to French (LOC+LANG 3) – set the language to German (LOC+LANG 4) – set the language to Italian (LOC+LANG 5) – set the language to Japanese (LOC+LANG 6) – set the language to Korean (LOC+LANG 7) – set the language to Russian (LOC+LANG 8) – set the language to Spanish	

(FCS) FOCUS (ZOM) ZOOM	READ/WRITE: WRITE ONLY
SUBCODE <No Sub code> Allows modifiers “n” and “p” for selecting “next” and “previous” values.	
DESCRIPTION OF USE Adjust the lens focus or zoom offset. Or use modifier “n” to increase value by 1 or “p” to decrease value by 1.	
EXAMPLES: (FCS n) to increase focus by 1 (ZOM p) to decrease zoom by 1	

(LVO) LENS SHIFT VERTICAL (LHO) LENS SHIFT HORIZONTAL	READ/WRITE: WRITE ONLY
SUBCODE <No Sub code> Allows modifiers “n” and “p” for selecting “next” and “previous” values.	
DESCRIPTION OF USE Adjust the lens vertical or horizontal offset. Or use modifier “n” to increase value by 1 or “p” to decrease value by 1.	
EXAMPLES: (LVO n) to increase vertical position by 1 (LHO p) to decrease horizontal position by 1	

(LCB+LOCK) LOCK LENS MOTORS	READ/WRITE: R/W
SUBCODE LOCK: Lock the Zoom, Focus, Horizontal and Vertical Lens motors. Allows modifiers “n” and “p” for selecting “next” and “previous” values.	
DESCRIPTION OF USE Select the function to prevent all lens motors from moving. It will effectively lock out any changes and, override all other lens features. This is useful to prevent lens position changes. Default value is ‘Allow’ movement.	
EXAMPLES: (LCB+LOCK0) : Allow (LCB+LOCK1) : Locked	

(LCB+HOME) LENS CENTER	READ/WRITE: WRITE ONLY
SUBCODE HOME: Move to center	
DESCRIPTION OF USE Calibrates the lens and then returns the lens to horizontal and vertical home position. Focus and Zoom are not affected.	
EXAMPLES: (LCB+HOME1)	

(CEL) CEILING MOUNT SETTING	READ/WRITE: R/W
SUBCODE <No Sub code>	
DESCRIPTION OF USE Change the orientation of the image for ceiling-mounted projectors. When set to 'On', the image will be turned upside-down.	
EXAMPLES: (CEL0) : Ceiling mount off. (CEL1) : Ceiling mount on. (CEL2) : Auto. (The projector uses a G-sensor to detect the orientation of the projector)	

(SOR) REAR PROJECTION	READ/WRITE: R/W
SUBCODE <No Sub code>	
DESCRIPTION OF USE Reverse the image so tha the image can be projected from behind a transluscent screen.	
EXAMPLES: (SOR0) : Off. (SOR1) : On.	

(MSH) MENU SHIFT HORIZONTAL (MSV) MENU SHIFT VERTICAL	READ/WRITE: R/W
SUBCODE <No Sub code>	
DESCRIPTION OF USE Adjusts the location of on-screen menus and messages. Valid range is 0 to 100. Default value is 0.	
EXAMPLES: (MSH0) - Set horizontal position of menu to left position. (MSV50) - Set vertical position of menu to center position.	

(MBE) SHOW MESSAGES (MESSAGE BOX ENABLE)	READ/WRITE: R/W
SUBCODE USER Allows modifiers “n” and “p” for selecting “next” and “previous” values.	
DESCRIPTION OF USE Controls whether or not the projector displays OSD messages (e.g. source name when searching or changing source, slider when changing keystone, etc.). Default value is ‘On’.	
EXAMPLES: (MBE+USER0) : OFF (MBE+USER1) : ON	

(OST) MENU TRANSPARENCY	READ/WRITE: R/W
SUBCODE <No Sub code>	
DESCRIPTION OF USE Controls amount of transparency of the OSD (for menu and messages). Valid range is 0 to 90. Default value is 0 (not transparent).	
EXAMPLES: (OST0)	

(SPS) SPLASH SCREEN SETUP	READ/WRITE: R/W
SUBCODE SLCT Allows modifiers “n” and “p” for selecting “next” and “previous” values.	
DESCRIPTION OF USE Choose which splash screen is to be used when no image or test pattern is displayed. Default value is ‘Factory Logo’.	
EXAMPLES: (SPS+SLCT0) : Factory Logo (SPS+SLCT 1) : Blue (SPS+SLCT 2) : Black (SPS+SLCT 3) : White	

(PIV) PIN PROTECT	READ/WRITE: R/W
SUBCODE <No Sub code>	
DESCRIPTION OF USE The PIN (personal Identification Number) allows you to password protect the projector. Once the PIN feature is enabled, the PIN must be entered before an image can be projected.	
EXAMPLES: (PIV"XXXXX") : if XXXXX Password is correct, the Pin protect function Toggles.	
Note: XXXXX is number from 0 to 9	

(PCG) CHANGE PIN	READ/WRITE: R/W
SUBCODE <No Sub code>	
DESCRIPTION OF USE Change the PIN (Personal Identification Number). Default PIN is '12345'.	
EXAMPLES: (PCG"OOOOO,NNNNN") OOOOO means old password. NNNNN means new password.	
Note: XXXXX is number from 0 to 9	

(PWR+STBM) STANDBY MODE	READ/WRITE: R/W
SUBCODE STBM Allows modifiers "n" and "p" for selecting "next" and "previous" values.	
DESCRIPTION OF USE Standby Modes are: • 1W Mode: when this mode has been selected, the power consumption is under 1W (to meet EUP regulation) and only the Keypad gets power. The system cannot power on via "UART/WEB/USB". •Communication Mode: when this mode has been selected, the power consumption is approximately 20W, and both the Keypad and processor are powered. The system can power on via "UART/WEB/USB".	
EXAMPLES: (PWR+STBM0) : 1W mode (PWR+STBM1) : Communication.	

(APW) AUTO POWER ON	READ/WRITE: R/W
SUBCODE <No Sub code> Allows modifiers “n” and “p” for selecting “next” and “previous” values.	
DESCRIPTION OF USE Enables and disables the projector’s automatic power on (allows the projector to be turned on using a wall switch). When this mode been selected, the system will power on automatically and skip standby mode when AC power is applied. Default value is ‘Off’.	
EXAMPLES: (APW0) : OFF (APW1) : ON	

(ASH) AUTO SHUTDOWN	READ/WRITE: R/W
SUBCODE <No Sub code> Allows modifiers “n” and “p” for selecting “next” and “previous” values.	
DESCRIPTION OF USE If the projector is in the Search state for longer than the set time wothout detecting an active signal, it automatically powers down to ‘Standby Mode’.	
EXAMPLES: Default value is Off/Never (ASH0) turns off auto shutdown mode(same as never) (ASH1) 5 MIN (ASH2) 10 MIN (ASH3) 15 MIN (ASH4) 20 MIN (ASH5) 25 MIN (ASH6) 30 MIN	

(SLP) SLEEP TIMER	READ/WRITE: R/W
SUBCODE <No Sub code> enables or disables sleep mode. Allows modifiers “n” and “p” for selecting “next” and “previous” values.	
DESCRIPTION OF USE Allows the projector to automatically power off after it has been on for a specified amount of time. Timer starts when projector is powered on (or when sleep timer auto power off is canceled). Auto power off occurs whether or not a source is being displayed.	
EXAMPLES: (SLP0) : OFF. (SLP1) : 2 Hrs. (SLP2) : 4 Hrs. (SLP3) : 6 Hrs. Default value is Off/Never	

(HAT) HIGH ALTITUDE	READ/WRITE: R/W
SUBCODE <No Sub code> Allows modifiers “n” and “p” for selecting “next” and “previous” values	
DESCRIPTION OF USE Modify the fan speeds for high altitude.	
EXAMPLES: (HAT0): High Altitude off. (HAT1): High Altitude on.	

(NET) NETWORK	READ/WRITE: R/W
SUBCODE DHCP - Turn DHCP On/Off. ETH0 - IP address SUB0 - Subnet mask GATE - Default gateway HOST – Projector name MAC0 - MAC Address SHOW - Show Network Messages - Turn Messages On/Off. RSTR - Restart network RSET - Network Factory Reset	
DESCRIPTION OF USE Modify the network settings or return network settings back to their factory default values.	
EXAMPLES: (NET+DHCP0) (NET+HOST”DWU670-E”) (NET+MAC0”00:E0:47:01:02:3C”) (NET+SHOW1) (NET+ETH0”192.168.000.001”) (NET+RSTR1) (NET+SUB0”255.255.255.000”)	

(BDR) SERIAL PORT BAUD RATE	READ/WRITE: R/W
SUBCODE <No Sub code> Allows modifiers “n” and “p” for selecting “next” and “previous” values	
DESCRIPTION OF USE Selects the serial port baud rate. Default value is ‘115200’.	
EXAMPLES: (BDR0) : 2400. (BDR1) : 4800. (BDR2) : 9600. (BDR3) : 14400 (BDR4) : 19200. (BDR5) : 38400. (BDR6) : 57600. (BDR7) : 115200.	

(SEC) SERIAL PORT ECHO	READ/WRITE: R/W
SUBCODE <No Sub code> Allows modifiers “n” and “p” for selecting “next” and “previous” values	
DESCRIPTION OF USE Controls whether the serial port echoes characters. Default value is ‘Off’.	
EXAMPLES: (SEC0) : OFF. (SEC1) : ON	

(VTT) 12V TRIGGER	READ/WRITE: R/W
SUBCODE <No Sub code> Allows modifiers “n” and “p” for selecting “next” and “previous” values	
DESCRIPTION OF USE The 12V trigger is an interface that is used for electrical projector screens. The screen is lowered or raised automatically when the projector is switched ‘On/Off’.	
EXAMPLES: (VTT0): 12V Trigger off. (VTT1): 12V Trigger on.	

(HKS) HOT-KEY SETTINGS	READ/WRITE: R/W
SUBCODE <No Sub code> Allows modifiers “n” and “p” for selecting “next” and “previous” values	
DESCRIPTION OF USE Assign a different function to the ‘Hot-key’ on the IR remote. Choose a function that does not have a dedicated button, allowing you to quickly and easily use that chosen function.	
EXAMPLES: (HKS0) : Blank Screen. (HKS1) : Aspect Ratio. (HKS2) : Freeze Screen. (HKS3) : Projector Info. (HKS4) : Overscan (HKS5) : Closed Captions.	

LAMP COMMANDS

(LPM) LAMP POWER	READ/WRITE: R/W
SUBCODE <No Sub code>	
DESCRIPTION OF USE Set the lamp power. Default value is 330W.	
EXAMPLES: (LPM0) : 280w (LPM1) : 285w (LPM2) : .290w (LPM3) :295w (LPM4) : 300w (LPM5) :305w (LPM6) : 310w (LPM7) :315w (LPM8) : 320w. (LPM9) :325w (LPM10) : 330w	

(LOP) CURRENT LAMP	READ/WRITE: R/W
SUBCODE <No Sub code> Allows modifiers “n” and “p” for selecting “next” and “previous” values	
DESCRIPTION OF USE Controls which lamp(s) are in use.	
EXAMPLES: (LOP1) : Only Lamp 1 lit. (LOP2) : Only Lamp 2 lit. (LOP3) : Both Lamps lit.	

(WSP) WHISPER MODE	READ/WRITE: R/W
SUBCODE <No Sub code> Allows modifiers “n” and “p” for selecting “next” and “previous” values	
DESCRIPTION OF USE Switch to ‘Whisper Mode’. This will switch the projector to the quietest possible mode. Lamp power will be dropped to the minimum. This mode is not compatible with ‘High Altitude Mode’.	
EXAMPLES: (WSP0): Off. (WSP1): Lamp1. (WSP2): Lamp2. (WSP3): Auto.	

(LSF) LAMP AUTO SWITCH	READ/WRITE: R/W
SUBCODE <No Sub code>: Control when the projector switches between lamps.Allows modifiers “n” and “p” for selecting “next” and “previous” values TIME : Set number of hours for Lamp Auto Switch.	
DESCRIPTION OF USE Controls when the projector switches between lamps.	
EXAMPLES: (LSF0) : Only switch lamps if a lamp fails. (LSF1) : Switch lamps every time the projector is powered on (also switch if a lamp fails). (LSF2) : Switch lamps after the current lamp has operated for the indicated number of hours (also switch if a lamp fails). (LSF+TIME120) : Set the Lamp Auto Switch number hours to be 120 when selected item is “After N Hours”.	

(LIF) LAMP INFO	READ/WRITE: READ ONLY
SUBCODE LP1H : Get Lamp 1 Hours LP2H : Get Lamp 2 Hours LPTH : Get Total Hours All Lamps LP1R : Get Lamp 1 Reset times LP2R : Get Lamp 2 Reset times	
DESCRIPTION OF USE Display current lamp hour usage.	
EXAMPLES: (LIF+LP1H?)	

(LPL) LAMP LIFE WARNING	READ/WRITE: R/W
SUBCODE <No Sub code>	
DESCRIPTION OF USE Set the number of lamp hours of usage at which a warning must be given. When that number of hours is reached on either lamp, a warning message will be displayed at power on, indicating that the lamp should be changed. This is a user settable limit only, and does not guarantee any number of hours for lamp life. This control has no bearing on lamp warranty and is not tied to actual lamp life in any way. The default is 0, which means that the feature is off and no warning will be generated.	
EXAMPLES: (LPL1500)	

(LPC) RESET LAMP HOURS	READ/WRITE: WRITE ONLY
SUBCODE LMP1 : Reset Lamp1 Hours. LMP2 : Reset Lamp2 Hours. BOTH : Reset both Lamps hours.	
DESCRIPTION OF USE Reset Lamp hours for both or Lamp1 or Lamp2.	
EXAMPLES: (LPC+LMP11) : Reset Lamp 1 Hours. (LPC+LAMP21) : Reset Lamp 2 Hours. (LPC+BOTH1) : Reset both lamps hours.	

INPUT SWITCHING & PIP COMMANDS

(SIN) INPUT/SOURCE CHANGE FUNCTIONS	READ/WRITE: R/W
SUBCODE <No Sub code> select the input to be displayed in the Main image. (MAIN #) : select the input to be displayed in the Main image. (PIIP #) : select the input to be displayed in the PIP image.	
DESCRIPTION OF USE Change source directly.	
EXAMPLES: (SIN0) : Change source to VGA1. (SIN1) : Change source to VGA2. (SIN2) : Change source to RGBHV (5-wire BNC) (SIN3) : Change source to HDMI 1. (SIN4) : Change source to HDMI 2. (SIN5) : Change source to Component Video. (SIN6) : Change source to S-Video. (SIN7) : Change source to Composite Video. (SIN+MAIN1) : Set Main Source to be “VGA2”. (SIN+PIIP0) : Set PIP Source to be “VGA1”.	

(PIP) PIP/PBP FUNCTIONS	READ/WRITE: R/W
SUBCODE <No Sub code>	
DESCRIPTION OF USE Enable or Disable PIP/PBP. Default value is ‘Disabled’.	
EXAMPLES: (PIP 0) : Disable PIP/PBP (PIP 1) : Enable PIP/PBP	

(PPS) PIP/PBP SWAP	READ/WRITE: WRITE ONLY
SUBCODE <No Sub code>	
DESCRIPTION OF USE Swap MAIN and PIP sources.	
EXAMPLES: (PPS1) : Swap MAIN and PIP sources.	

(PHS) PIP/PBP SIZE	READ/WRITE: R/W
SUBCODE <No Sub code>	
DESCRIPTION OF USE Select the PIP/PBP size.	
EXAMPLES: (PHS0) : Small size. (PHS1) : Medium size. (PHS2) : Large size.	
NOTE: Refer to Appendix 1.	

(PPP) PIP/PBP LAYOUT	READ/WRITE: R/W
SUBCODE <No Sub code>	
DESCRIPTION OF USE Set the location of the PIP/PBP image.	
EXAMPLES: (PPP0) : POP,Bigger Left. (PPP1) : Over-Under, Bigger Upper. (PPP2) : POP,Bigger Right. (PPP3) : Over-Under, Bigger Lower. (PPP4) : PIP-Bottom Right. (PPP5) : PIP-Bottom Left. (PPP6) : PIP-Top Left. (PPP7) : PIP-Top Right.	
NOTE: Refer to Appendix 1.	

(TMG) TIMING DETECT MODE	READ/WRITE: R/W
SUBCODE <No Sub code> Allows modifiers “n” and “p” for selecting “next” and “previous” values	
DESCRIPTION OF USE Select ‘Timing Detection Mode’ to be wide or normal.	
EXAMPLES: (TMG0) : Normal (TMG1) : Wide	

(MIF) MAIN (SINGLE) SOURCE INFO	READ/WRITE: READ ONLY
SUBCODE ACTS : Get Active Source SGFT : Get Signal Format APRT : Get Aspect Ratio. RESL : Get Resolution. VREF : Get Vert Refresh. HREF : Get Horz Refresh. PIXC : Get Pixel Clock. SYNC : Get SYNC Type CLSP : Get Color Space.	
DESCRIPTION OF USE Shows the setting of the current source of the main image.	
EXAMPLES: (MIF+RESL?) - Return the main image resolution.	

(SIF) SECONDARY SOURCE INFO	READ/WRITE: READ ONLY
SUBCODE ACTS : Get Active Source SGFT : Get Signal Format APRT : Get Aspect Ratio. RESL : Get Resolution. VREF : Get Vert Refresh. HREF : Get Horz Refresh. PIXC : Get Pixel Clock. SYNC : Get SYNC Type CLSP : Get Color Space.	
DESCRIPTION OF USE Show the settings of the current source in the PIP/PBP image. This is only valid when PIP/PBP is enabled.	
EXAMPLES: (SIF+RESL?) - Return the resolution of the PIP Image.	

(ESH) ENABLED MAIN SOURCE HOT KEY READ/WRITE: R/W
SUBCODE <No Sub Code>
DESCRIPTION OF USE Enabled the hot key(0,9) to select source directly.
EXAMPLES: (ESH0) : ON (ESH1) : OFF

(MHK) MAIN SOURCE HOT-KEY SETTINGS READ/WRITE: R/W
SUBCODE VGA1 : Set a number key to be hot-key for VGA1. VGA2 : Set a number key to be hot-key for VGA2 BNC1 : Set a number key to be hot-key for BNC HDM1 : Set a number key to be hot-key for HDMI1 HDM2 : Set a number key to be hot-key for HDMI2 CON1 : Set a number key to be hot-key for Component SVDO : Set a number key to be hot-key for S-Video COPS : Set a number key to be hot-key for Composite
DESCRIPTION OF USE Allows the assignment of a Hot-key to a particular source.
EXAMPLES: (MHK+VGA18) : Set number 8 to be hot-key for VGA1.

(SKS) SOURCE KEY FUNCTION SETTING READ/WRITE: READ ONLY
SUBCODE <No Sub Code>
DESCRIPTION OF USE Assign a different function to the source Hot-key. The default function is ‘List all sources’.
EXAMPLES: Function of the key to: (SKS0) : Change source. (SKS1) : List all of Sources. (SKS2) : Change source with Auto

MISCELLANEOUS COMMANDS

(ITP) TEST PATTERN	READ/WRITE: R/W
SUBCODE <No Sub code> Allows modifiers “n” and “p” for selecting “next” and “previous” values	
DESCRIPTION OF USE Display a test Pattern. Some test patterns are only available when logged-in as a Service user. Note that when switching away from the Grid or Color Bars test patterns, the switch may take up to 18 seconds as these are special non-standard test patterns.	
EXAMPLES: (ITP0) : OFF (ITP1) : Grid (ITP2) : White (ITP3) : Black (ITP4) : Checkerboard (ITP5) Color bars (ITP6) : Red(Service mode only) (ITP7) : Green(Service mode only) (ITP8) : Blue(Service mode only) (ITP9) : Yellow(Service mode only) (ITP10) : Magenta(Service mode only) (ITP11) : Cyan(Service mode only)	

(SST) PROJECTOR STATUS	READ/WRITE: READ ONLY
SUBCODE <No Sub code>	
DESCRIPTION OF USE Status query command.	
EXAMPLES: (SST?) Returns a series of responses as below items. (SST!000 "DWU670-E" "Model Name") (SST!001 "UC100712345" "Serial Number") (SST!002 "1920x1200" "Native Resolution") (SST!003 "HDMI 1" "Main Input") (SST!004 "Digital" "Main Signal Format") (SST!005 "148.5MHz" "Main Pixel") (SST!006 "Separate" "Main Sync Type") (SST!007 "67.7kHz" "Main Horz Refresh") (SST!008 "60.0Hz" "Main Vert Refresh") (SST!009 "HDMI 2" "PIP / PBP Input") (SST!010 "Digital" "PIP / PBP Signal Format") (SST!011 "135.2MHz" "PIP / PBP Pixel Clock") (SST!012 "Separate" "PIP / PBP Sync Type") (SST!013 "62.7kHz" "PIP / PBP Horz Refresh") (SST!014 "60.0Hz" "PIP / PBP Vert Refresh") (SST!015 "330 W" "Lamp Power Setting") (SST!016 "Lamp 2" "Current Lamp") (SST!017 "10 Hours" "Lamp 1 Hours") (SST!018 "15 Hours" "Lamp 2 Hours") (SST!019 "1W Mode" "Standby Mode") (SST!020 "Allow" "Lens Lock Setting") (SST!021 "192.168.1.10" "IP Address") (SST!022 "On" "DHCP")	

SERVICE COMMANDS

(CWI) COLOR WHEEL INDEX SETTING	READ/WRITE: R/W
SUBCODE SPX2 : Set up color wheel index for 2x speed. SPX3 : Set up color wheel index for 3x speed.	
DESCRIPTION OF USE Color wheel index setting for 2x or 3x speed.	
EXAMPLES: (CWI+SPX2 26)	
Note: This command only working with service mode is “on”.	

(PIF) PROJECTOR INFO	READ/WRITE: READ ONLY
SUBCODE MDLN : Get Model Name SNUM : Get Serial-Number. NERS : Get Native Resolution. FWVS : Get FW version. CFVS : Get Configuration. BCVS : Get Boot Code Version.	
DESCRIPTION OF USE Displays read-only projector information. This function is only available when logged in as a ‘Service‘ user.	
EXAMPLES: (PIF+MDLN?)	

(DEF) FACTORY DEFAULTS	READ/WRITE: WRITE ONLY
SUBCODE <No sub-code>	
DESCRIPTION OF USE Returns all settings back to “new out of the box” configuration. The number 111 must be sent with the command to prevent accidental use of this command. This function is only available when logged in as a ‘Service’ user.	
EXAMPLES: (DEF 111)	

(UID) ENTER SERVICE CODE	READ/WRITE: WRITE ONLY
SUBCODE <No Sub Code>	
DESCRIPTION OF USE Enter Service code to set the projector to ‘Service Mode’. There are some service functions that will only work when in ‘Service Mode’. The ‘Service Mode’ is turned ‘Off” when the projector is powered ‘Off”. Format of the command is (UID “username,password”).	
EXAMPLES: (UID”service,service”)	

FUNCTIONS USED ONLY BY SERIAL COMMAND

(SIV) E SERIES SERIAL COMMAND VERSION	READ/WRITE: READ ONLY
SUBCODE <No Sub Code>	
DESCRIPTION OF USE Get E Series serial command version.	
EXAMPLES: (SIV?)	

(LCE) LAST SERIAL COMMAND ERROR	READ/WRITE: READ ONLY
SUBCODE <No Sub Code>	
DESCRIPTION OF USE Get last serial command error.	
EXAMPLES: (LCE?)	

(LSE) GET LAST SYSTEM ERROR	READ/WRITE: READ ONLY
SUBCODE <No Sub Code>	
DESCRIPTION OF USE Get last system ERROR.(Lamp fail or fan fail or…….)	
EXAMPLES: LSE=1: The lamp did not strike after 5 attemps. LSE=3: Lamp went out unexpectedly. LSE=4: Fan failure. LSE=5: Over temperature.	

(PWR) POWER ON/OFF	READ/WRITE: R/W
SUBCODE <No Sub code> Allows modifiers “n” and “p” for selecting “next” and “previous” values	
DESCRIPTION OF USE Power on/off projector. Power On will switch the projector from ‘Standby Mode’ to ‘Lamps On’. Power Off will switch the projector back to ‘Standby Mode’.	
EXAMPLES: (PWR0) : Power off projector. (PWR1) : Power on projector.	

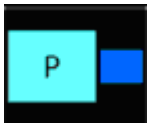
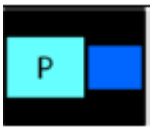
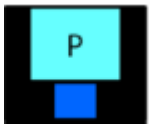
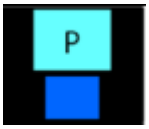
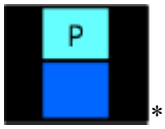
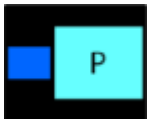
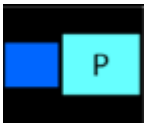
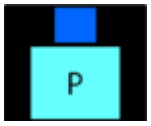
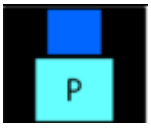
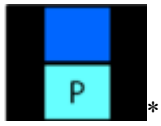
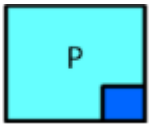
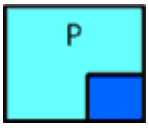
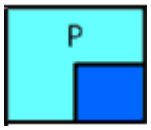
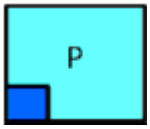
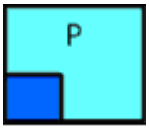
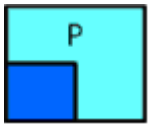
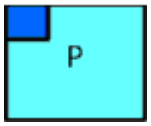
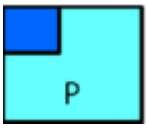
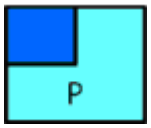
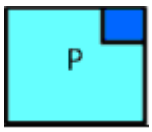
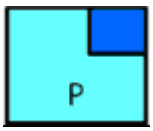
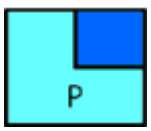
(SNS) SOURCE NAME SETTING	READ/WRITE: R/W
SUBCODE SRC0 : Set new source name for VGA1 input. SRC1 : Set new source name for VGA2 input. SRC2 : Set new source name for BNC input. SRC3 : Set new source name for HDMI1 input. SRC4 : Set new source name for HDMI2 input. SRC5 : Set new source name for Component input. SRC6 : Set new source name for S-Video input. SRC7 : Set new source name for Video input.	
DESCRIPTION OF USE Change the source name to a user-defined name.	
EXAMPLES: (SNS+SRC1”WUXGA”) : change the source name “VGA1” to “WUXGA”	

(KEY) KEY-CODE ENTRY SETTING	READ/WRITE: WRITE ONLY
SUBCODE <No Sub code>	
DESCRIPTION OF USE Used by manufacturing and service. Sends key codes to the projector, which should respond as if the key was pressed on the keypad or remote. See Sonic Infrared Key-code Specification(Appendix-2)	
EXAMPLES: (KEY17) : Send menu key to projector, the projector will show menu on OSD.	

(SHU) SHUTTER ON/OFF CONTROL	READ/WRITE: R/W
SUBCODE <No Sub code> Allows modifiers “n” and “p” for selecting “next” and “previous” values	
DESCRIPTION OF USE Open or close the shutter.	
EXAMPLES: (SHU0) : Open/Sutter off. (SHU1) : Closed/Sutter on.<Displayed black screen>	

(OSD) OSD SHOW/HIDE	READ/WRITE: R/W
SUBCODE <No Sub code> Allows modifiers “n” and “p” for selecting “next” and “previous” values	
DESCRIPTION OF USE Disable or enable the OSD. If the menu is displayed and the OSD is disabled, the OSD will disappear. When it is enabled again, the menu will reappear at the same position that it was before being disabled. This is unlike exiting from the menu on the OSD, which always returns to the first menu position (item 1 in the Main menu).	
EXAMPLES: (OSD0): Hide. (OSD1): Show.	

APPENDIX-1

PIP/PBP LAYOUT	PIP/PBP SIZE		
	Small	Medium	Large
	Note: 'P' indicates primary source region (lighter color)		
PBP Bigger Left			
Over-Under, Bigger Upper			 *
PBP, Bigger Right			 *
Over-Under, Bigger Lower			 *
PIP-Bottom Right			
PIP-Bottom Left			
PIP-Top Left			
PIP-Top Right			

***Both source regions are the same size.**

APPENDIX-2

IR REMOTE KEYCODES

The (KEY) command uses decimal values.

The Following are issues when using the (KEY) COMMAND:

1. Enter key works in the menu but in a drop down menu it will not select an item.
2. Exit key works in the menu but in a drop down menu it will exit out of that specific menu instead of just the drop down menu.

REMOTE BUTTON	KEYCODE (DECIMAL)
POWER	0
INFO	66
AUTO	47
1	26
2	27
3	28
4	29
5	30
6	31
7	32
8	33
9	34
HELP	35
0	36
HOT KEY	65
MENU	19
TEST	1
SHUTTER	2
EXIT	20
UP	38
RIGHT	41
DOWN	42
LEFT	39
ENTER	40
INPUT	48

REMOTE BUTTON	KEYCODE (DECIMAL)
OSD	49
CONTRAST	24
BRIGHT	25
FOCUS_LEFT	5
FOCUS_RIGHT	6
DISPLAY	64
GAMMA	23
ZOOM-	9
ZOOM+	10
KEYSTONE H-LEFT	69
KEYSTONE H-RIGHT	70
LENS H-LEFT	13
LENS H-RIGHT	14
KEYSTONE V-UP	71
KEYSTONE V-DOWN	72
LENS V-UP	18
LENS V-DOWN	17
PIP/POP	15
SIZE	67
LAYOUT	68
SWAP	43