

Reference Guide

020-101335-02

Entero HB Serial Commands



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Introduction

This document provides information and procedures for using serial commands (ASCII text messages) to control Entero HB display cubes.

RS232 Communication Parameters

This table lists the communication parameters for the display cube RS232 port.

Parameter	Value
Baud rate	115200 bps
Stop bits	1 bit
Data bits	8 bits
Parity	None
Flow control	None

Connect to the RS232 Port



- To send serial commands over the Ethernet port, you must login. Use the UID serial command to configure the login. See [UID–User ID](#) on page 24.

You can use an RS232 connection to remotely access display controls and image setups, issue commands or queries, and receive replies.

1. Connect one end of a null standard 9-pin female to female modem cable to the projector RS232 port.
2. Connect the other end of the null standard 9-pin female to female modem cable to a computer.

Message Types and Formats

Commands sent to and from the display cube are formatted as simple text messages that consist of a three letter command code, an optional four letter subcode, and optional data. You can include

optional features such as message acknowledgments with your commands. This table lists the available message types.

Message Type	Description
Set	A command to set a display 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.

Messages are sent and read as ASCII character strings. However, the message travels as a sequence of bytes. Each character in this sequence requires 1 byte. This example illustrates how a Power On command is sent to the display.

ASCII =	(P	W	R		1)
---------	---	---	---	---	--	---	---

HEX =	0x28	0x50	0x57	0x52	0x20	0x31	0x29
-------	------	------	------	------	------	------	------

This table lists the message format.

Source	Format	Function	Example
From Controller	(Code Data)	SET (set color of selected internal test pattern to white)	(ITP 4)
	(Code+Subcode Data)	SET (set display wall brightness to 800)	(CCM+TBRT 800)
	(Code?)	REQUEST (what is screen orientation of selected displays?)	(SOR?)
From Display	(Code Data)	Command dependent and generally represented by space delimited rows and columns.	

Message Structure

This table lists the components of an ASCII command.

Message Element	Description
Parentheses	Commands are enclosed by parentheses (). If a start character is received before an end character of the previous message, the partial (previous) message is discarded.

Message Element	Description
Prefix characters (optional)	<p>Acknowledges the display cube has responded or increases message integrity when added before the 3-character function code.</p> <p>If the message cannot be executed, a not-acknowledge (NAK) is returned.</p> <p>Use the number symbol (#) to request a full acknowledgment. A full acknowledgement sends an echo of the message as a reply from the projector when it finishes processing the command. Do not include a full acknowledgement in a request message.</p> <p>Use the dollar symbol (\$) to request a simple acknowledgment. When a command executes successfully, a dollar symbol (\$) is returned.</p> <p>Use the ampersand symbol (&) to add a checksum as the last message parameter. For example, (&PWR 1 144).</p> <p>The display 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. If the values do not match, the message is discarded</p> <p>Use an "h" to indicate a hex number. If a request message includes a checksum, a checksum is included with the reply. An acknowledge or checksum character can occur first.</p>
Display numbers (optional)	Selects a specific display by its system index or display number.
Function code	The primary display cube function being queried or modified. Each function code is represented by a three-character, upper or lower case ASCII code (A-Z). The function code appears after the first parenthesis. If a command does not include a subcode, you must add a space between the function code and the first parameter (or special character).
+subcode	<p>The secondary display cube function being queried or modified. Each subcode is represented by a four-character, upper or lower case ASCII code (A-Z and 0-9). The subcode appears after the function code, and it is separated from the function code with a plus symbol (+).</p> <p>If a subcode is not included, the plus symbol is not required. If a command includes a subcode, you must add a space between the subcode and the first parameter (or special character).</p>
Request and reply symbols	<p>The question mark symbol (?) appears after the function code when the controller requests display cube information.</p> <p>An exclamation mark (!) appears after the function code when the display cube responds to a request.</p> <p>Do not include a question or exclamation mark when creating a SET command.</p>

User Access Permissions

Permission	Description
Guest	Can be run without logging in
Admin	The default
Service	Can access all administration and service commands

Commands

This section lists the commands that you can use with Entero HB RPMSP, RPMHD, and RPMWU-LED02 display cubes. To prevent an alteration or an interruption of the controller script, do not use the web interface or the on-screen display when the script is running. Some commands are operational only when the display is on.

CCM—Color and Brightness

Modifies color and brightness settings. The color and brightness adjustments are automatically synchronized between the displays. The settings affect the entire array.

Parameters

- **Access Level:** Admin

Commands

Command	Description	Values
CCM?	Returns the color and brightness settings for the array.	-
CCM+TBRT <Brightness>	Sets the brightness for the array.	-
CCM+CLRT <ColourTemperature>	Sets the color temperature for the array.	-
CCM+TCLR <redx> <redy> <greenx> <greeny> <bluex> <bluey>	Sets the target gamut/color space for the array.	-
CCM+BRTM <mode>	Sets the brightness mode for the array.	0 = Normal Mode 1 = Economy Brightness Mode 2 = Fixed Brightness Mode 3 = High Brightness Mode
CCM+CLRM <mode>	Sets the color gamut mode for the array.	0 = Maximum Gamut 1 = SRGB Gamut 2 = Custom Gamut

Command	Description	Values
CCM+WEAK?	Returns the weak display threshold for each selected display.	-
CCM+WEAK <threshold>	Sets the weak display drop threshold for the selected displays.	0.0 to 1.0

DCA–Display Color Adjust

Adjusts the color and brightness of a specific display. Affects the selected displays and requires only one display to be selected.

Parameters

- **Access Level:** Admin

Commands

Commands	Description	Values
DCA?	Returns the display color and brightness settings.	-
DCA <brightness> <RedofRed> <GreenofRed> <BlueofRed> <RedofGreen> <GreenofGreen> <BlueofGreen> <RedofBlue> <GreenofBlue> <BlueofBlue> <RedofWhite> <GreenofWhite> <BlueofWhite>	Sets the display color and brightness.	-200 to 0 = Adjusts brightness 0 to 100 = Adjusts all other parameters

DEF–Factory Defaults

Resets all preference and configuration settings to their default values. To prevent accidental use of this command, the number 111 must follow the command. Restoring factory defaults does not affect network settings, date and time.

Parameters

- **Access Level:** Service

Commands

Command	Description	Values
DEF 111	Performs the factory default command.	111—Must be entered exactly as is

Examples

Reset the projector to factory defaults.

(DEF 111)

```
(65535 00000 FYI00919 "All settings have been restored to their factory defaults.
Reboot is required to take effect.")
```

DID—Display Identification

Sets the number, name, or identifier for the display. Typically, displays are numbered with 0 in the top left corner and continuing to the right across the row before moving down to the next row. Valid numbers are 0 to 999. Affects the selected displays.

Parameters

- **Access Level:** Admin

Commands

Command	Description	Values
DID?	Returns the numbers currently assigned to displays.	-
DID <number>	Assigns a number to a display.	-
DID+AUTO	Automatically numbers all displays in the current array.	-

DSN—Display Serial Number

Retrieves or assigns the serial number for the selected displays.

Parameters

- **Access Level:** Service

Commands

Command	Description	Values
DSN?	Returns the serial number for the selected display.	-
DSN <serial>	Sets the serial number for the selected display.	-

EDD-EDID

Sets Extended Display Identification Data (EDID) timing for DVI inputs.

Parameters

- **Access Level:** Service

Commands

Command	Description	Values
EDD?	Returns the current EDID timing.	-
EDD+AUTO <port>	Automatically sets the EDID to values typical for the display's light engine.	<port>: 0 = For primary DVI input. 1 = For optional secondary DVI input. all = Both primary and secondary DVI inputs.
EDD <port> <horizontal> <vertical> <framerate>	Sets the resolution and framerate.	<horizontal> = Sets the horizontal resolution <vertical> = Sets the vertical resolution <framerate> = Sets the framerate

ERR-Errors

Displays the error log for the selected displays.

Parameters

- **Access Level:** Admin

Commands

Command	Description	Values
ERR?	Returns the error log for the selected display.	-

INP-Input

Changes the video input selection properties. The system controls video input through four predefined modes. By setting a mode, the system monitors video inputs on the DVI inputs and determine which to display on the screen.

Parameters

- **Access Level:** Admin

Commands

Command	Description	Values
INP?	Returns the current video input mode.	-
INP <mode>	Sets the video input mode.	0 = Show DVI1 only 1 = Show DVI2 only 2 = Show DVI1; if DVI1 does not have a valid signal, fallback to DVI 2 3 = Show DVI2; if DVI2 does not have a valid signal, fallback to DVI 1

ITP-Internal Test Pattern

Displays a predefined test pattern on the display.

Parameters

- **Access Level:** Admin

Commands

Command	Description	Values
ITP <pattern>	Displays a tests pattern on the display.	1 = None 2 = Grid 3 = Grayscale 16 4 = White 5 = Flat Gray 6 = Black 7 = Checker 8 = 13 Point 9 = Color Bars 10 = Edge Blend 11 = High Frequency 12 = Gradient Blur 13 = Red 14 = Green 15 = Blue

LOC–Localization Language

Sets or returns the language displayed on the user interface and on-screen display.

Parameters

- **Access Level:** Administrator

Commands

Command	Description	Values
LOC?	Returns the language used by the selected display.	-
LOC+LANG <language>	Sets the display language.	0 = English 1 = French 2 = Spanish 3 = Italian 4 = German 5 = Japanese 6 = Chinese

Examples

Set language to French.

(**LOC+LANG 1**)

Get language.

(**LOC?**)

LST–List Displays

Returns a list of all the displays in the current array. All displays in the array respond and color match.

Parameters

- **Access Level:** Admin

Commands

Command	Description	Values
LST?	Returns a list of all displays in the current array.	-

MAP–Map Display

Maps displays by their network MAC address. Use the (**AVL?**) command to return a list of all displays that can be mapped. Use the (**LST?**) command to return a list of all displays mapped to the array.

For effective communication between displays and color matching, all displays in an array must be mapped. By default, all displays are mapped to the **def** array. To prevent interference from other displays connected to the same network, change the default mapping of all displays in an array.

Parameters

- **Access Level:** Admin

Commands

Command	Description	Values
MAP?	Returns a lists of all Sirius devices in a network. All displays in the list can be grouped in an array.	-
MAP+ADD <mac address> <array> <x position> <y position>	Maps a display to an array and identifies its position with its MAC address.	<mac address> = MAC address of the display <array> = Array to which the display is mapped <x position> = X coordinate in the array <y position> = y coordinate in the array
MAP+ALL <array> <x position> <y position>	Maps all displays to the same array and position. Christie does not recommend using this command; each display should have its x and y positions set individually.	<array> = Array to which the display is mapped <x position> = X coordinate in the array <y position> = y coordinate in the array

NET–Network Setup

Modifies the network settings of a display. By default, all displays request IP addresses from DHCP on ETH2. For effective communication between displays and color matching, connect all displays in an array to the same network.

Parameters

- **Control Group:** Configuration/Preference
- **Subclass:** Power Down
- **Access Level:** Admin

Commands

Command	Description	Values
NET? <port>	Returns the settings of a specific network port.	-
NET+AUTO <port>	Sets a specific network port to DHCP mode and removes the static IP settings.	-

Command	Description	Values
NET <port> <ip> <subnet> <gateway>	Sets the specified network port to use a static IP.	<port> = Must be 0 <ip> = IP address <subnet> = Subnet address <gateway> = Gateway address

OSD–On Screen Display

Displays or removes overlay information in the on-screen display (OSD), including the status, information, and mapping overlay pages.

Parameters

- **Access Level:** Admin

Commands

Command	Description	Values
OSD+STAT <0 1>	Displays or removes the OSD status overlay page.	0 = Removes the OSD status overlay page 1 = Displays the OSD status overlay page
OSD+INFO <0 1>	Displays or removes the OSD info overlay page.	0 = Removes the OSD info overlay page 1 = Displays the OSD info overlay page
OSD+MAPP <0 1>	Displays or removes the OSD mapping overlay page.	0 = Removes the OSD mapping overlay page 1 = Displays the OSD mapping overlay page

PNG–Ping

Returns basic projector information to the user, including the type of device and main software version.

Parameters

- **Access Level:** Admin

Commands

Command	Description	Return Parameters
PNG?	Returns the return the family ID, model, and software version for a display	[Family ID] - 53 = Sirius [Model] - 0 = SXGA+, 1 = H, 2 = WUXGA [Software Version Major] [Software Version Minor] [Software Version Sub] [Software Version SVN]

PWR–Power

Turns a display on or off, or deactivates auto-power on. By default, auto-power on is active and a display turns on and video plays when it is reset or turned off. When auto-power on is inactive, the display enters standby mode when it is reset or turned off.

Parameters

- **Access Level:** Admin

Commands

Command	Description	Values
PWR?	Returns the power settings for the display.	-
PWR <mode>	Changes the display power mode.	0 = Turns the display off 1 = Turns the display on
PWR+AUTO <autopower>	Turns auto-power off or on.	0 = Turns off auto-power on 1 = Turns on auto-power on

REM–Remote

Activates or deactivates the infrared receiver on a display. If the infrared receiver is deactivated, use the web interface or a serial command to enable it.

Parameters

- **Access Level:** Admin

Commands

Command	Description	Values
REM?	Returns the status of the infrared receiver.	-
REM <mode>	Activates or deactivates the infrared receiver.	0 = Deactivates the infrared receiver 1 = Activates the infrared receiver

RST–Reset

Restarts a display.

Parameters

- **Access Level:** Admin

Commands

Command	Description	Values
RST	Restarts the display.	-

RTM–Runtime

Returns the EM and light engine runtime in hours.

Parameters

- **Access Level:** Admin

Commands

Command	Description	Values
RTM?	Returns the runtime in hours.	-

SAR–Subarray

Configures settings for the subarrays.

Parameters

- **Access Level:** Admin

Commands

Command	Description	Values
SAR?	From the specified displays, the displays that belong to subarrays are listed. Displays that are not part of a subarray are not listed.	-
SAR+ACTV <mode> <number>	Turns the specified subarray on or off.	mode = <ul style="list-style-type: none"> • 0 = off • 1 = on number = Number of the subarray to apply <mode> to. <ul style="list-style-type: none"> • 1-25 • ALL = Apply <mode> to all subarrays.
SAR+ADDS <number> <topleftX> <topleftY> <width> <height>	Creates a subarray that includes all the displays within the specified coordinate range. The SAR+ACTV command must be issued to activate the subarray before video is configured.	number = Number of the subarray being created. 1 to 25 topleftX = X coordinate of top left corner of new subarray topleftY = Y coordinate of top left corner of new subarray width = Width of the subarray, in number of displays height = Height of the subarray, in number of displays
SAR+DELS <number> <norefresh>	Deletes a single subarray or all subarrays. When issued, the specified subarrays are deleted and the video is reconfigured automatically. With the optional <norefresh> parameter, the specified subarray is deleted, but the video is not reconfigured.	number = Number of the subarray being deleted. <ul style="list-style-type: none"> • 1-25 • ALL = Delete all subarrays. NOREFRESH = Does not reconfigure the video after a subarray is deleted. (Optional parameter)
SAR+REFR	Refreshes the video of all displays causing them to recalculate the tiling and scaling.	-

SCL-Scale

Adjusts the scaling mode.

Parameters

- **Access Level:** Admin

Commands

Command	Description	Values
SCL?	Returns the scaling mode.	-
SCL <mode>	Sets the scaling mode.	0 = 1:1, video is centered, scaling not applied 1 = Scale-to-fit, video is centered and scaled to fit the display native resolution 2 = Scale-to-fit with aspect ratio; video is centered and scaled while maintaining aspect ratio
SCL+ALL?	Returns the scaling mode and scale adjustment parameters.	-

SEL-Select

Selects single or multiple displays. You can select displays by their system index, name, or number. Do not use the web interface or on-screen display (OS) when you run this command.

Parameters

- **Access Level:** Admin

Commands

Command	Description	Values
SEL?	Returns a list of system indexes for the selected displays.	-
SEL ALL	Selects all displays.	-
SEL NONE	Deselects all displays.	-
SEL+NAME <number 0> ... <number N>	Selects a display by number ID. Returns a list of number IDs.	-
SEL <index 0> .. <index N>	Selects a display by index number. Returns a list of indexes.	-

SHU–Shutter

Turns the virtual shutter on specific displays on or off. This command can only be run when the display is on. If the display is in standby mode, the virtual shutter is off. This functionality is not persistent.

Parameters

- **Access Level:** Admin

Commands

Command	Description	Values
SHU0	Turns off the shutter.	-
SHU1	Turns on the shutter.	-

Examples

Open the shutter.

(SHU 0)

Close the shutter.

(SHU 1)

Get the state of the shutter (0 for open, 1 for closed).

(SHU?)

SIX–Six Axis Adjuster

Aligns the projected image with the edges of the screen by adjusting the position, keystone, zoom, and tilt of the image geometry.

Parameters

- **Access Level:** Service

Commands

Command	Description	Values
SIX+ZOOM <0 1>	Increases or decreases the six-axis zoom control.	0 = Decreases the zoom 1 = Increases the zoom
SIX+HKEY <0 1>	Increases or decreases the six-axis horizontal keystone control.	0 = Decreases the horizontal keystone 1 = Increases the horizontal keystone

Command	Description	Values
SIX+VKEY <0 1>	Increases or decreases the six-axis vertical keystone control.	0 = Decreases the vertical keystone 1 = Increases the vertical keystone
SIX+TILT <0 1>	Increases or decreases the six-axis tilt control.	0 = Decreases the tilt 1 = Increases the tilt
SIX+HPOS <0 1>	Increases or decreases the six-axis horizontal position control.	0 = Decreases the horizontal position 1 = Increases the horizontal position
SIX+VPOS <0 1>	Increases or decreases the six-axis vertical position control.	0 = Decreases the vertical position 1 = Increases the vertical position
SIX+MODE <0 1>	Sets the access mode for the six-axis adjuster.	0 = Sets default mode (rear access) 1 = Sets front access mode, where the hkey, vkey, hpos, and vpos controls are reversed.
SIX+DOOR	Releases the front access cube door latches.	
SIX+STOP	Stops any current adjustment.	

SOR–Screen Orientation

Changes the orientation of the displayed image.

Parameters

- **Access Level:** Admin

Commands

Command	Description	Values
SOR?	Returns the screen orientation.	-
SOR <mode>	Sets the screen orientation.	0 = Normal projection (Default, Rear Projection) 1 = Horizontal flip 2 = Vertical flip 3 = Horizontal and vertical flip

TIL–Tiling Mode

Sends one video input to all tiles and has it automatically stretched across the entire array. For tiling to work correctly, all displays in the array must be mapped to their correct coordinates.

Parameters

- **Access Level:** Admin

Commands

Command	Description	Values
TIL?	Returns the tiling mode setting.	-
TIL <mode>	Sets the tiling mode.	0 = Disables tiling mode and enables independent display mode 1 - Enables tiling mode and disables independent display mode

TMD–Time and Date

Sets the display time and date.

Parameters

- **Access Level:** Admin

Commands

Command	Description	Values
TMD?	Returns the time and date.	-
TMD+TIME hh:mm:ss	Sets the local time in a 24-hour clock format.	-
TMD+DATE yy/mm/dd	Sets the date with the format yyyy/mm/dd.	-
TMD+FULL yy/mm/dd hh:mm:ss	Sets the time and date.	-

Examples

Get the local time.

(**TMD+TIME?**)

Set the time to 3pm.

(**TMD+TIM "15:00:00"**)

(65535 0000 FYI0916 "Setting Time to 15:00:00")

Get the date to January 17th, 2015

(TMD+DATE "2015/01/17")

(65535 00000 FYI--916 "Setting Date to 2015/01/17")

TMP–Temperatures

Retrieves the historical temperature data for different array areas.

Parameters

- **Access Level:** Admin

Commands

Command	Description	Values
TMP?	Returns all current temperatures.	-
TMP+PEAK?	Returns all peak temperatures.	-
TMP+AVER?	Returns all average temperatures.	-
TMP+HIST? ALL	Returns all temperature histories.	-
TMP+HIST? ENV	Returns the Environment (ENV) temperature history.	-
TMP+HIST? DMD	Returns the DMD temperature history.	-
TMP+HIST? DRV	Returns the DRV temperature history.	-
TMP+HIST? CPU	Returns the Electronic Module (EM) CPU temperature history.	-
TMP+HIST? RED	Returns the red temperature history.	-
TMP+HIST? BLU	Returns the blue temperature history.	-
TMP+HIST? GRN	Returns the green temperature history.	-

UID–User ID

Applies a username and password to access serial command subsets. The available logins are guest, user, admin, and service. The default is guest on the TCP connection, web interface, and on-screen display. The default for the serial port is admin.

Parameters

- **Access Level:** Guest

Commands

Command	Description	Values
UID?	Returns the current access level.	-
UID <username password>	Logs in with the username and password. Do not add quotation marks or spaces.	-
UID	Resets the log in to the default settings.	Default access settings: Web interface—guest—can only run the UID command. On-screen display—user— additional access privileges can be configured through the OSD interface. TCP—guest—can only run the UID command. Serial—user—additional access privileges can be configured through the UID command.

UNI—Uniformity

Adjusts the display so no area appears brighter than another.

Parameters

- **Access Level:** Admin

Commands

Command	Description	Values
UNI?	Returns the uniformity status.	-
UNI <mode>	Sets the brightness uniformity mode.	0 = Sets brightness uniformity mode off 1 = Sets brightness uniformity mode on (Default)

VER—Version

Retrieves the firmware version.

Parameters

- **Access Level:** Admin

Commands

Subcode	Description	Values
VER?	Returns the firmware version running on the selected display.	-
VER+BOOT?	Returns the bootloader version running on the selected display.	-

WIR–Wireless

Configures the wireless network connection.

Parameters

- **Access Level:** Admin

Commands

Command	Description	Values
WIR?	Returns the wireless settings.	-
WIR+MODE <0 1>	Turns the wireless connection on or off.	0 = Turns wireless off 1 = Turns wireless on
WIR+MODE 1 <ssid> <pass>	Turns the wireless connection on and specifies the service set identification (SSID) and password.	-

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