Technical Reference

Christie MicroTiles
Serial Commands

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b. Projector lamps (See Christie's separate lamp program policy).

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f. Problems or damage caused by misuse, improper power source, accident, fire, flood, lightening, earthquake or other natural disaster.

g. Problems or damage caused by improper installation/alignment, or by equipment modification, if by other than Christie service personnel or a Christie authorized repair service provider.

h. Problems or damage caused by use of a product on a motion platform or other movable device where such product has not been designed, modified or approved by Christie for such use.

i. Problems or damage caused by use of a projector in the presence of an oil-based fog machine or laser-based lighting that is unrelated to the projector.

j. For LCD projectors, the warranty period specified in the warranty applies only where the LCD projector is in "normal use" which means the LCD projector is not used more than 8 hours a day, 5 days a week.

k. Except where the product is designed for outdoor use, problems or damage caused by use of the product outdoors unless such product is protected from precipitation or other adverse weather or environmental conditions and the ambient temperature is within the recommended ambient temperature set forth in the specifications for such product.

l. Image retention on LCD flat panels.

m.Defects caused by normal wear and tear or otherwise due to normal aging of a product.

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The warranty does not obligate Christie to provide any on site warranty service at the product site location.

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The product has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the product is operated in a commercial environment. The product generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of the product in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at the user's own expense.
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The product is designed and manufactured with high-quality materials and components that can be recycled and reused. This symbol ⌧ means that electrical and electronic equipment, at their end-of-life, should be disposed of separately from regular waste. Please dispose of the product appropriately and according to local regulations. In the European Union, there are separate collection systems for used electrical and electronic products. Please help us to conserve the environment we live in!

Content

Introduction

This document provides information and procedures for using serial commands (ASCII text messages) to control MicroTiles and ECUs in the array.

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
TCP/IP port	3002

Connect to the RS232 Port

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.

Terminal Program Setup

To setup terminal program for proper echoing, see below:

TeraTerm

Setup->Terminal->Local echo: checked

Setup->Terminal->New-Line->Transmit: "CR+LF"

HyperTerm

File->Properties->ASCII setup-> Send line ends with line feeds: checked

File->Properties->ASCII setup-> Echo typed characters locally: checked

TCP

You can also use TeraTerm to connect to the TCP port of Microtiles ECU.

File->New connection->TCP->Host: ECU IP address

File->New connection->TCP->Telnet: unchecked

File->New connection->TCP->TCP port#: 3002

Serial Commands

> ℹ️
> - The commands and parameters are case sensitive. Use capital letters for the commands.
> - Send a carriage return "/r" or new line "/n" at the end of your output, this will start the processing of command.
> - Before executing a command that applies to selected tiles or ECUs, you must execute the SEL command to identify the tiles or ECUs. See *SEL–Select* on page 21.

AAC–Automatic Array Configuration

Automatically detects changes in the array's setup and configures the array. For example, addition or deletion of tiles, moving of tiles, changing of subarrays, changing of manually mapped tiles.

Commands

Command	Description	Values
AAC?	Returns the automatic array reconfiguration mode.	-
AAC <0|1>	Sets the automatic array reconfiguration mode.	0 = Off 1 = On

AGN–Alignment

Sets the image alignment of the MicroTiles.

Commands

Command	Description
AGN?	Retrieves the image alignment adjustment of the selected MicroTiles.

Command	Description
AGN <top left x> <top left y> <top right x> <top right y> <bottom left x> <bottom left y> <bottom left x> <bottom left y>	Sets the image alignment adjustment of the selected Microtiles.

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.

Commands

Command	Description	Values
CCM+MODE?	Returns the color match mode for the array.	-
CCM+MODE <mode>	Sets the color match mode.	TILE = Sets the color match mode to tile mode CANVAS = Sets the color match mode to canvas mode
CCM+BRTM?	Returns the brightness mode for the array.	-
CCM+BRTM <mode>	Sets the brightness mode.	ECON = Economy Brightness Mode FIXED = Fixed Brightness Mode MAX = Maximum Brightness
CCM+TBRT?	Returns the target brightness when in fixed brightness mode.	-
CCM+TBRT <value>	Sets the target brightness, in nits, when in fixed brightness mode.	-
CCM+ABRT?	Returns the actual brightness.	-
CCM+CLRM?	Returns the color gamut mode for the array.	-
CCM+CLRM <mode>	Sets the color gamut mode.	FIXED = Fixed Gamut SRGB = SRGB Gamut MAX = Maximum Gamut
CCM+CLRT?	Returns the color temperature for the array.	-
CCM+CLRT <Color Temperature>	Sets the color temperature.	-
CCM+DPPC?	Returns the weak tile threshold.	-
CCM+DPPC <percentage>	Sets the weak tile threshold.	-

Command	Description	Values
CCM+MBPC?	Returns the brightness limit for Maximum Brightness.	-
CCM+MBPC <value>	Sets the brightness limit for Maximum Brightness.	-
CCM+TCLR?	Returns the target gamut/color space for the array. This command is only available if the Color Mode is set to FIXED.	-
CCM+TCLR <redx> <redy> <greenx> <greeny> <bluex> <bluey>	Sets the target gamut/color space for the array. This command is only available if the Color Mode is set to FIXED.	-
CCM+ACLR?	Returns the actual color gamut achieved on the canvas.	-

CNG–Configure Array

Configures the location of individual tiles using the automatic array configuration information, and sets the crop windows of all the tiles.

Commands

Command	Description	Values
CNG	Automatically configure the array.	-

DPW–Display Window

Sets the display window of global video source.

Commands

Command	Description	Values
DPW?	Retrieve the display window of the global video source.	-
DPW <x offset> <y offset> <width> <height>	Set the display window of the global video source. All parameters are from 0 to 1 decimal points.	-

EDD–EDID

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

Commands

Command	Description	Values
EDD?	Returns the custom EDID from the selected ECUs.	-
EDD <horizontal> <vertical> <framerate>	Sets the resolution and framerate.	<horizontal> = Sets the horizontal resolution in pixels. <vertical> = Sets the vertical resolution in pixels. <framerate> = Sets the framerate in Hz.

ITP–Internal Test Pattern

Enables or disables test patterns.

Draws a test pattern on the selected MicroTiles. The MicroTiles must be set to OSD video mode to display test patterns.

Puts a test on the screen or queries the test pattern currently displayed.

Parameters

- **Control Group**: Unsaved
- **Subclass**: Power Up
- **Access Level:** Operator

Commands

Command	Description	Values
ITP <index>	Enables or disables test patterns.	0 = Off 1 = Grid 2 = Grey Scale 16 3 = Flat White 4 = Flat Grey 5 = Flat Black 6 = Checker 7 = 17 Point 8 = Edge Blend 9 = Color Bars 10 = Multi Color 11 = RGBW Ramp 12 = Horizontal Ramp 13 = Vertical Ramp 14 = Diagonal Ramp 15 = Square Grid 16 = Diagonal Grid 17 = Prism / Convergence 18 = Maximum Activity 19 = FLIR
ITP+GREY <grey level>	Defines the shade of grey for the Flat Grey test pattern.	0 to 4095 2048 (Default)
ITP+RMPM <speed>	Defines the motion speed used for the Horizontal Ramp, Vertical Ramp, and Diagonal Ramp test patterns.	0 (Default) to 100
ITP+RMPS <slope>	Defines the slope used for the Horizontal Ramp, Vertical Ramp, and Diagonal Ramp test patterns.	1 (Default) to 5
ITP+RMPL <grey level>	Defines the starting (top/left) grey-level used for the Horizontal Ramp, Vertical Ramp, and Diagonal Ramp test patterns. This setting has no effect when the ramp is moving (such as ITP+RMPM is non-zero).	0 (Default) to 4095
ITP+GRDP <pitch>	Defines the spacing between lines used for the Square Grid and Diagonal Grid test patterns.	2 to 127 32 (Default)
ITP+GRDC <0 | 1>	Enables multi-color or white-on-black grids for the Square Grid or Diagonal Grid test patterns.	0 = Multi-color (Default) 1 = White-on-black
ITP+GRDM <0 | 1>	Enables moving or static grid for the Square Grid or Diagonal Grid test patterns.	0 = Static (Default) 1 = Moving

Command	Description	Values
ITP <pattern> <x> <y>	Displays a tests pattern on the display. To identify a specific tile add the tile width and height after the pattern value.	0 = OSD full field test pattern 1 = None 2 = Checkerboard 3 = Color square on a black 4 = Full field grid 5 = Full intensity color bars 7 = Full field inverted checkboard 8 = 13 Point 9 = Grayscale 16
ITP <pattern>	Displays a tests pattern on the display.	0 = Off 1 = Grid 2 = Grayscale 16 3 = White 4 = Flat grey 5 = Black 6 = Checker 7 = 13 Point 8 = Color Bars 11 = Aspect Ratio 12 = Edge Blend 14 = Boresight

Examples

Disable test patterns—revert to previous Input signal.

(ITP 0)

Set test pattern to the grid pattern.

(ITP 1)

LNQ–Link Quality

This is used to indicate the quality of the communication link (High Speed Serial Link) between MicroTiles.

Commands

Command	Description	Values
LNQ?	Requests the link quality of the selected MicroTiles.	-

Command	Description	Values
LNQ+REST	Resets the error count on channel 1 (HSSL Port 1) and channel 2 (HSSL Port 2). Notes: • The user should reset the error count first with (LNQ+REST) before requesting link quality. • The user should perform multiple requests (LNQ?) to see if the error count increase in subsequent request. • Under normal operating condition, the error count shall be stable and not increasing. Rapidly increasing error count usually indicates cabling issue.	-

Examples

Get the link quality of the MicroTiles.

(MMP+LIST?)

The following results are displayed:

```
Index    Serial          Ch1 Error Count      Ch2 Error Count
    0    0x0023ed84                   0                    0
    1    0x0023effb                  30                    0
    2    0x0024ccc3                   0                    8
    3    0x0024cfd9                   0                   32
```

This indicates tile 1 has 30 errors on Ch1 (HSSL Port 1) and tile 3 has 32 errors on Ch2 (HSSL Port 2).

A small amount of errors are normal, as long as they are not increasing on subsequent requests.

LST—List Displays

Returns a list of all the displays in the current array.

Commands

Command	Description	Values
LST?	Returns a list of all displays in the current array.	-
LST+TILS?	Returns a list of all MicroTiles.	-
LST+ECUS?	Returns a list of all ECUs.	-
LST+ARRY?	Returns a list of all components in the array.	-
LST+NGBR?	Returns a list of all neighbors.	-

Examples

Display all components in the array.

```
(LST+ARRY?)
```

The following information is returned:

```
Index   Id   xsize   ysize   count
  0      0     1        3       3
```

Display all neighbors.

```
(LST+NGBR?)
```

The following information is returned:

```
I   A-X,Y   Serial      Left       Bottom      Port0       Port1        Source0       Source1
0   0-0,0  0x0023cf00 0xffffffff 0x0024ccc3 0x0024ccc3-0 0x0023effb-1 0x0000000-0 0x0024e89d
1   0-0,2  0x0023effb 0xffffffff 0xffffffff 0x0024e89d-0 0x0023cf00-1 0x0024e89-d 0x00000000
2   0-0,1  0x0024ccc3 0xffffffff 0x0023effb 0x0023cf00-0 0x00000000-0 0x0024e89-d 0x00000000
```

MLR–Mullion Reduction

Sets the mullion reduction.

Commands

Command	Description	Values
MLR?	Returns the current mullion gain and width of the selected MicroTiles.	-
MLR 16 4	Sets the mullion gain to 16 and width to 4 on all MicroTiles.	-

Examples

Get the mullion gain and width.

```
(MLR?)
```

The following results are displayed:

```
Index   Serial       Gain    Width
0       0x0023ecf8   16      4
```

MMP–Manual Mapping

Configures manually mapped tiles.

Commands

Command	Description	Values
MMP+LIST?	Lists all manually mapped tiles.	-
MMP+ADD <index> <array> <x> <y>	Adds a manually mapped tile.	<index> = The number of the MicroTile in the MicroTiles list <array> = The index of the array <x> = The x coordinate <y> = The y coordinate
MMP+DEL <index>	Deletes a manually mapped tile.	<index> = The number of the manually mapped tile
MMP+DEL ALL	Deletes all manually mapped tiles.	

Examples

Get the list of manually mapped tiles.

```
(MMP+LIST?)
```

The following results are displayed:

```
Index   Serial      Array  X  Y
0       0x0023ecf8  0      0  0
```

NET–Network Setup

Changes the network configuration for the Ethernet port. By default, DHCP support is turned on.

Modifies the network settings of a display.

Modifies the network setup for this device.

Sets or requests the network setup for this device.

Parameters

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

Commands

Command	Description	Values
NET+DOMA	Sets the domain name	-
NET+ETH0	Sets the IP address for the first ethernet controller.	-
NET+GATE	Sets the network gateway.	-
NET+HOST	Sets the host name.	-
NET+MAC0	Gets the MAC address of the first ethernet controller.	-
NET+PORT	Sets the PORT number.	-
NET+SUB0	Sets the network subnet mask for the first ethernet controller.	-
NET <ip> <subnet> [gateway]	Sets the projector network settings as specified.	All three arguments are strings and the gateway is optional.
NET+DGRP <group>	Sets the device group name for the projector. This can help simplify broadcast searching by organizing projectors into groups, particularly if a large number of projectors are on the same local network.	-
NET+DHCP 1	Enables DHCP. To turn off DHCP support, switch to a static IP by using the base command.	-
NET+ETH0?	Returns the projector IP address. (Read-only)	-
NET+GATE?	Returns the projector gateway address. (Read-only)	-
NET+HOST <name>	Sets the name for the projector. With this set, devices on the same network subnet as the projector can connect to it using the name: <name>.local.	-
NET+MAC0?	Returns the MAC address of the Ethernet port. (Read-only)	-
NET+PORT?	Returns the TCP port used for the Christie Serial Protocol over Ethernet. (Read-only)	1024 to 49151 (with some exceptions) 3003 = Reserved on the projector and cannot be used for the Christie Serial Protocol
NET+SUB0?	Returns the projector netmask. (Read-only)	-

Command	Description	Values
NET+ETH0?	Returns the IP address from Ethernet port 0.	-
NET+ETH0 <IP address>	Sets the IP address for Ethernet port 0.	-
NET+SUB0?	Retrieves Network Subnet Mask from Ethernet port 0.	-
NET+SUB0 <subnet mask>	Sets the subnet mask for Ethernet port 0.	-
NET+GATE?	Retrieves the default gateway from Ethernet port 0.	-
NET+GATE <gateway>	Sets the default gateway for Ethernet port 0.	-
NET+MAC0?	Retrieves the MAC address from Ethernet port 0.	-
NET+MODE?	Retrieves the Network IP address mode, Auto or Manual.	-
NET+MODE <value>	Sets the network IP addressing mode.	Auto = Obtains the IP address automatically. Manual = Sets the IP address to the value identified by the user.

Examples

Set new IP address on the first ethernet controller.

(NET+ETH0 "192.168.1.35")

Set the gateway.

(NET+GATE "192.168.0.1")

Set the subnet mask on the first ethernet controller.

(NET+SUB0 "255.255.255.0")

Set the host name.

(NET+HOST "MyHostName")

Set the domain name.

(NET+DOMA "MyDomainName")

Get IP address from first controller. (NET+ETH0! "192.168.1.35").

(NET+ETH0 ?)

Get IP address from second controller. (NET+ETH1! "192.168.1.36").

(NET+ETH1 ?)

Get MAC address from first controller. (NET+MAC0! "00:12:3F:7B:76:B4").

(NET+MAC0 ?)

Get default gateway. (NET+GATE! "192.168.0.1").

(NET+GATE ?)

Set the Port number.

(NET+PORT 3002)

Get the Port number. (NET+PORT! 3002).

(NET+PORT ?)

Examples

Set the static IP address to 192.168.1.100, with a netmask of 255.255.255.0, and no gateway:

(NET "192.168.1.100" "255.255.255.0")

Turn on DHCP support:

(NET+DHCP 1)

PRI–Priority

Sets the priority of the ECUs.

Commands

Command	Description	Values
PRI?	Displays the priority of the selected ECUs.	-
PRI <priority>	Sets the priority of the selected ECU.	-

PWR–Power

Turns the display on or off.

Turns the projector power on and off.

Changes the power state of the projector.

Parameters

- **Control Group**: Unsaved
- **Subclass:** Power Down
- **Access Level:** Operator

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

Commands

Command	Description	Values
PWR+RBFS	Reboots the projector into failsafe mode. The projector must be in Standby mode before initiating this command.	0 = Power 0ff (to Standby mode) 1 = Power on (to Lamps On mode) 10 = Cool down lamp is cooling down—controlled by lamp (Read-only) 11 = Warm-up lamp is warming up—controlled by lamp (read-only) 20 = AutoShutdown mode 1 (Read-only) 21 = AutoShutdown mode 2 (Read-only) 22 = AutoShutdown mode 3 (Read-only) 23 = Emergency shutdown, ending in Power off

Commands

Command	Description	Values
PWR <0 | 1>	Turns the projector on or off.	0 = Turns the projector off 1 = Turns the projector on
PWR+ELEC <0 | 1>	Keep video electronics on in standby, regardless of lamplaser state.	0 = Disables electronics override 1 = Enables electronics override
PWR?	Returns the current power state of the projector: 000 = Power Off 011 = Warming Up 001 = On 010 = Cooling Down	-

Examples

Get projector power status.

(PWR ?)

Turn the lamp and all electrical power on.

(PWR1)

Set the projector to Standby mode.

(PWR0)

Reboot into failsafe mode.

(PWR+RBFS 1)

Examples

Turn on the projector.

(PWR 1)

Turn off the projector.

(PWR 0)

Return current state of the power to the projector.

(PWR?)

(PWR!000 "Power Off")

RST–Reset

Restarts a display.

Commands

Command	Description	Values
RST	Resets all selected tiles and ECUs.	-
RST+ECUS	Resets all selected ECUs. The prefix # and $ has no effect on the RST+ECUS command.	-
RST+TILS	Resets all selected MicroTiles.	-

SAR–Subarray

Configures settings for the subarrays.

Commands

Command	Description	Values
SAR+LIST	Lists all the subarrays and their properties.	
SAR+ADD_ <array> <x> <y> <width> <height>	Adds a subarray.	array = The number of the array. x = The x coordinate of the top left MicroTiles. y = The y coordinate of the top left MicroTiles. width = Number of MicroTiles in the subarray in the x dimension. height = Number of MicroTiles in the subarray the y dimension.
SAR+AUTO	Automatically configures the subarrays.	
SAR+DEL <index>	Deletes a subarray.	index = The number of the subarray.
SAR+DEL_ ALL	Deletes all the subarrays.	
SAR+ENBL <index>	Enables a subarray.	index = The number of the subarray.
SAR+DSBL <index>	Disables a subarray.	index = The number of the subarray.
SAR+DPWN <index> <x> <y> <width> <height>	Sets the display window.	index = The number of the subarray. x = x offset in decimal points (0.0 - 1.0). y = y offset in decimal points (0.0 - 1.0). width = width of the display window in decimal points (0.0 – 1.0). height = height of the display window in decimal points (0.0 – 1.0).
SAR+INPT <index> <type>	Sets the input selection.	index = The number of the subarray. type: • 0 = no video • 1 = global video source • 2 = local video • 3 = either local or global video source

Examples

Get a list of subarrays.

(SAR+LIST?)

The following results are displayed:

```
Index array  x  y width height input enable  xoffset  yoffset  width   height
    0     0  0  0     1      1     2      1  0.00000  0.00000  1.0000  1.0000
```

SEL–Select

Selects single or multiple displays.

Commands

Command	Description	Values
SEL?	Returns a list of system indexes for the selected displays.	-
SEL+ECUS ALL	Selects all ECUs.	-
SEL+ECUS NONE	Deselects all ECUs.	-
SEL+ECUS <number>	Selects the ECU by number.	-
SEL+TILS ALL	Selects all tiles.	-
SEL+TILS NONE	Deselects all tiles.	-
SEL+TILS <number>	Selects the tile by number.	-

SHP–Sharpness

Sets the sharpness of the MicroTiles.

Commands

Command	Description	Values
SHP?	Returns the current sharpness of the selected MicroTiles.	-
SHP 50	Sets the sharpness to 50 on all MicroTile.	-

Examples

Get the sharpness.

(SHP?)

The following results are displayed:

```
Index   Serial       Sharpness
0       0x0023ecf8   50
```

TMD–Time and Date

Sets the display time and date.

Sets the date and time in the real-time clock.

Sets the date, time, or time zone.

Parameters

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

Commands

Command	Description	Values
TMD+TIME <time>	Sets the time for the clock. Time must be set using the 24 hour clock (regardless of the LOC+TIME setting).	time = String in the following format: hh:mm:ss
TMD+DATE <date>	Sets the date for the clock.	date = String in the following format: YYYY/MM/DD
TMD+TIME?	Returns the local time from the selected ECUs. In the results, @ indicates the current ECU and m indicates the master ECU.	-
TMD+TIME hh:mm:ss	Sets the local time in a 24-hour clock format.	-
TMD+DATE?	Returns the local date from the selected ECUs. In the results, @ indicates the current ECU and m indicates the master ECU.	-
TMD+DATE yy/mm/dd	Sets the date with the format yyyy/mm/dd.	-

Examples

Set the time to 3pm.

(TMD+TIME "15:00:00")

Set the date to September 17th, 2014.

(TMD+DATE "2014/09/17")

Get the local time.

(TMD+TIME?)

The following results are displayed:

```
Index   IP              Serial       Time
@m 0    192.168.228.45  0x0024e999   17:50:45
```

Examples

Get the local time.

(TMD+TIME?)

Set the time to 3pm.

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

(65535 00000 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")

UCR–Uniformity Correction

Turns the uniformity correction on and off.

Commands

Command	Description	Values
UCR?	Returns the uniformity correction settings for the display.	-
UCR <0 | 1>	Changes the uniformity correction settings for the display.	0 = Off 1 = On

Examples

Get the uniformity correction.

(UCR?)

The following results are displayed:

```
Index   Serial      Uniformity Correction
0       0x0023ecf8  1
```

VDM–Video Mode

Sets the video mode.

Commands

Command	Description	Values
VDM <0 | 1 | 2>	Sets the video mode on the selected MicroTiles.	0 = Video 1 = Unscaled OSD 2 = Scaled OSD

VER–Version

Retrieves the firmware version.

Commands

Subcode	Description	Values
VER?	Returns the firmware and hardware version of the selected MicroTiles and ECUs.	-
VER+TILS?	Returns the firmware and hardware version of the selected MicroTiles.	-
VER+ECUS?	Returns the firmware and hardware version of the selected ECUs.	-

XLS–System Information

Returns a list of all the displays in the current array, providing more information than the (LST+TILS?) command.

Commands

Command	Description	Values
XLS+TILS?	Returns a list of all the tiles in the current array, and the status of the tiles.	-

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