RS-232 CONTROL

Storm (Version 1 Models 42", 47", 55")
Hydra (19", 27")
TV Mirrors (10", 19", 27")
Premier™ Series Displays (S1 Models 32" - 65")

Séura displays are designed to work with many 3rd party control systems. One method of communicating with the display is RS-232 or serial control. Typical tasks are turning the display on and off, setting the input source, changing the channel, and adjusting the volume.

KEYS TO SUCCESS

Baud Rate
Each display is designed to respond to signals using a specific baud rate. Baud rates for each Séura display are listed in the settings table below.

Cable
A cross cable or serial cable with null modem adapter is typically used. This connects the transmit pin on the control system with the receive pin on the display. The transmit pin on the display should also connect to the receive pin on the control system. The display will respond to each command with an OK or ERR which is helpful when troubleshooting.

For Premier S1 models, see the S1 command table on page 10 for responses.

Note: the cable supplied with the Storm crosses the transmit and receive conductors internally.

Note: The 10.5, 19.5, and 27.5 models use a straight through serial cable (no cross cable).

See the pin-out diagrams below for more information.

Command Syntax
All commands in the command table below must end with a carriage return and line feed. The method of accomplishing this varies from control system to control system. Some examples are given below the command table.

Testing
We strongly recommend that you test your cable and control program before installing the Séura display.

Support
Contact Séura (800) 957-3872 for technical support. Technical support can also help answer RS-232 questions during the planning stage of your project.

Settings Tables

Legacy Models: Storm 42.1, Storm 47.1, Storm 55.1
10.1, 10.2, 19.1, 19.2, & 19.3 TV Mirrors, 19.3 Hydra

Baud Rate	9600 bps
Data Length	8 bits
Parity Bit	None
Stop Bit	1 bit
Flow Control	None

Current Models: 10.5, 19.5, 27.5 TV Mirrors, 19.5 & 27.5 Hydras
Legacy Models: 19.4 Hydra, 10.4, 19.4, & 10.3 TV Mirrors

Baud Rate	115200 bps
Data Length	8 bits
Parity Bit	None
Stop Bit	1 bit
Flow Control	None

Current Models: S1 Mirror Displays

Baud rate is configurable from the OSD Service Menu.
Default baud rate is 38400.
Default access password for Service Menu is 1 2 3 4

Baud Rate	9600, 19200, 38400
Data Length	8 bits
Parity Bit	None
Stop Bit	1 bit
Flow Control	None

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Command Table

	1	2	3	4	5	6	7	8	
Power									
	P	O	W	R	0				Power Off (sends TV into Standby)
	P	O	W	R	1				Power On
	R	S	P	W	0				obsolete
	R	S	P	W	1				obsolete
Input									
	I	T	G	D	X				toggle the input source
	I	T	V	D	0				set the input source to TV, channel is set to the last channel tuned
	I	A	V	D	1				sets the input source to AV (composite video)
	I	A	V	D	2				sets the input source to S-Video (if equipped), HDMI 1 (Storm)
	I	A	V	D	3				sets the input source to Component Video (if equipped), USB (Storm)
	I	A	V	D	4				sets the input source to VGA (PC Input)
	I	A	V	D	5				sets the input source to HDMI, or HDMI2 (Storm)
Volume									
	V	O	L	M					sets the volume level
									*shaded characters may be any number from 0 to 99
Zoom									
	W	I	D	E	1				toggles the view mode
	W	I	D	E	2				sets the view mode to side bar (AV input with 4:3 signal)
	W	I	D	E	3				sets the view mode to zoom (AV input with 4:3 signal)
	W	I	D	E	4				sets the view mode to stretch (AV input with 4:3 signal)
	W	I	D	E	5				sets the view mode to normal (PC input)
	W	I	D	E	6				sets the view mode to zoom (PC input)
	W	I	D	E	7				sets the view mode to stretch (PC input)
	W	I	D	E	8				sets the view mode to dot-by-dot
	W	I	D	E	9				sets the view mode to full screen
Mute									
	M	U	T	E	1				mutes the audio
	M	U	T	E	2				turns off mute, audio can be heard
Sleep Timer									
	O	F	T	M	0				disables the sleep timer
	O	F	T	M	1				TV turns off in 30 minutes
	O	F	T	M	2				TV turns off in 60 minutes
	O	F	T	M	3				TV turns off in 90 minutes
	O	F	T	M	4				TV turns off in 120 minutes
Channel									
	D	A	2	P					sets ATSC tuner to a specific over the air channel, XX-YY or XX.YY is entered as XXYY
	D	C	2	U					sets cable tuner to a channel
	C	H	U	P	X				channel up
	C	H	D	W	X				channel down

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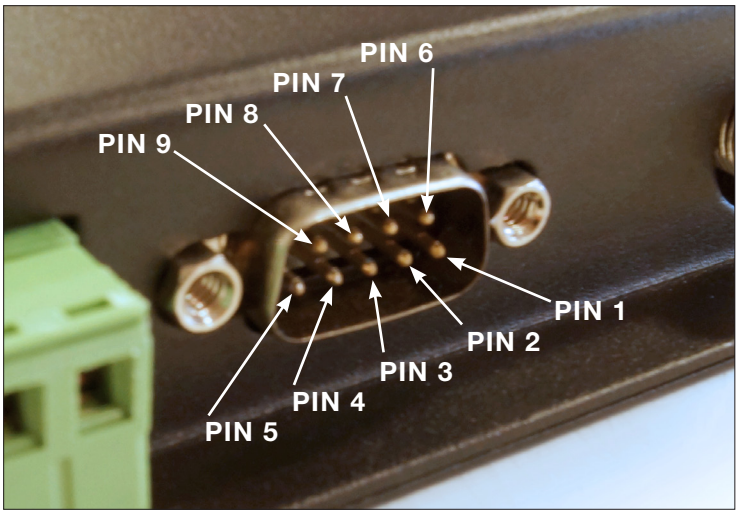
EXAMPLES

The following examples show the command for power on, and the command for setting the volume to level 12. These examples illustrate some of the different methods used by control systems to denote the carriage return and line feed characters. See the documentation for your control system for more information.

POWR1	VOLM12
POWR10d0a	VOLM120d0a
POWR1\r\n	VOLM12\r\n
POWR1\x0d\x0a	VOLM12\x0d\x0a
POWR1/h0d/h0a	VOLM12/h0d/h0a

PIN-OUT DIAGRAM



D-SUB 9 Pin Connector
male (TV), female (serial)

TV			Control System	
	PIN		**PIN**	
No Connection	1		1	No Connection
Receive (RxD)	2		2	Receive (RxD)
Transmit (TxD)	3		3	Transmit (TxD)
No Connection	4		4	No Connection
Ground	5		5	Ground
No Connection	6		6	No Connection
No Connection	7		7	No Connection
No Connection	8		8	No Connection
No Connection	9		9	No Connection

TROUBLESHOOTING

Do you get a response from the TV after sending a command?

- Yes
  - OK – this means the command worked
  - ERR – this is usually a syntax problem
    - may need spaces after the command to make 8 characters
    - could mean the command wasn't appropriate
    - (sending power on when TV is already on, etc.)
    - sometimes the power on command must be sent twice
- No Response
  - Double check the cable
    - Is the cable crossing pins 2 & 3?
    - Is there continuity from pin 5 to pin 5?
    - The cable included with Storm TV is crossed internally (don't use a cross cable if extending)
    - When terminating your own cable…
      - TxD (transmit) on device 1 needs to connect to RxD (receive) on device 2 (transmit is typically pin 3)
      - RxD (receive) on device 1 needs to connect to TxD (transmit) on device 2 (receive is typically pin 2)
    - How long is the cable? Allowable length depends on baud rate, cable capacitance, and control system.
  - Verify the baud rate
    - all Séura TVs started at 9600 bps
    - all 10 and 19-inch TVs have transitioned to 115200 bps
    - S1 Premier Series TVs must be 38400 bps
  - Often no response means the command isn't ended correctly
    - Command should end in a carriage return, then line feed

METHOD OF TESTING USING A PC AND HYPERTERMINAL

The following steps can be used to verify that the RS-232 system on the TV is working correctly. This can be helpful when troubleshooting since it can pinpoint whether the issue is with the TV or with the control system.

Needed Items:

- PC or laptop with serial port.
- Serial cross cable, or serial cable with null modem adapter.

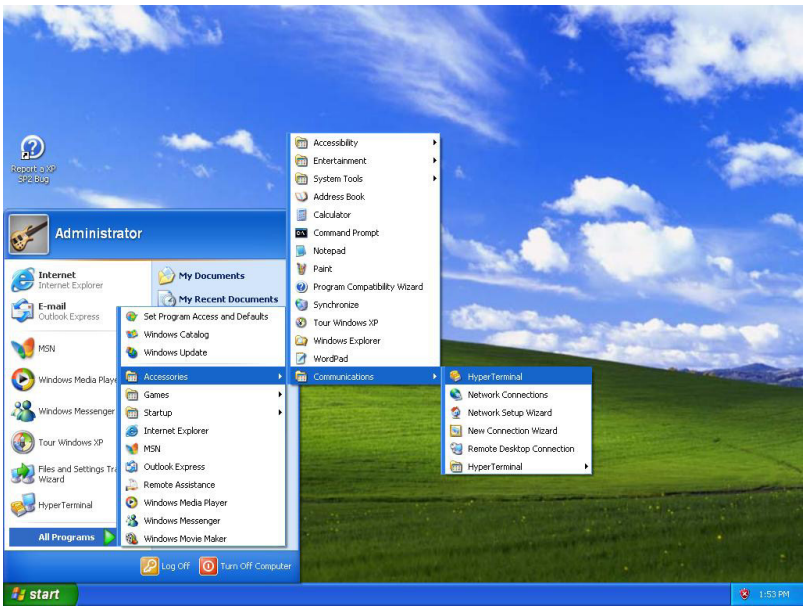
1

Typical Windows Path to HyperTerminal

Note: Newer computers do not typically come with HyperTerminal. It is possible to move a copy of HyperTerminal from an older computer to a new computer. Simply locate and move the following files:

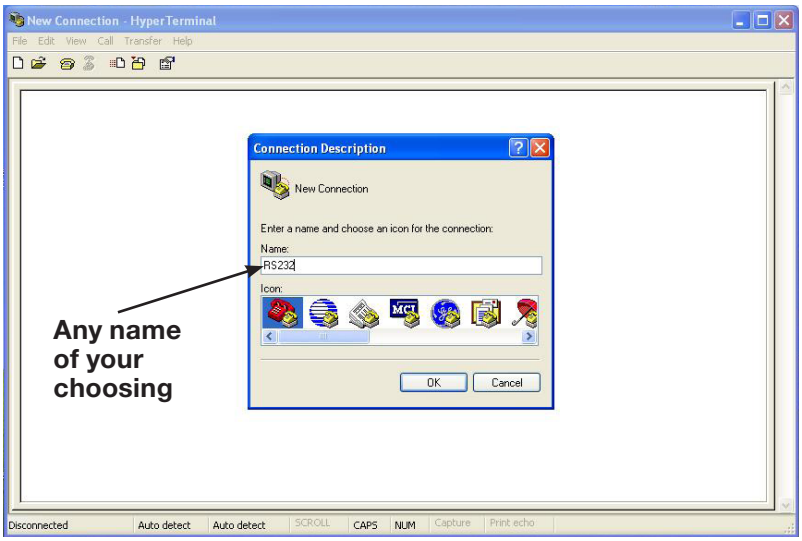
hypertrm.exe
hypertrm.dll

Note 2: Laptop computers are rarely equipped with a serial port. USB to Serial adapters are available but may not work for RS-232 controls.



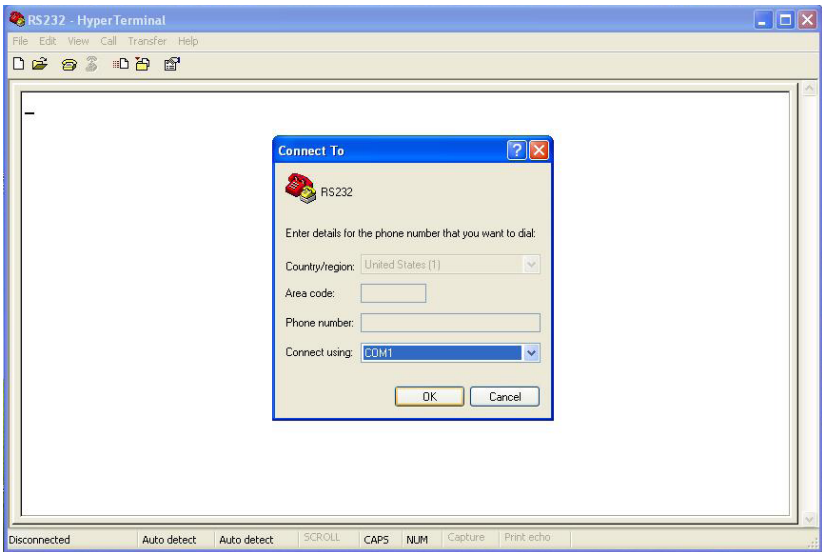
2

Enter a name for the HyperTerminal session.



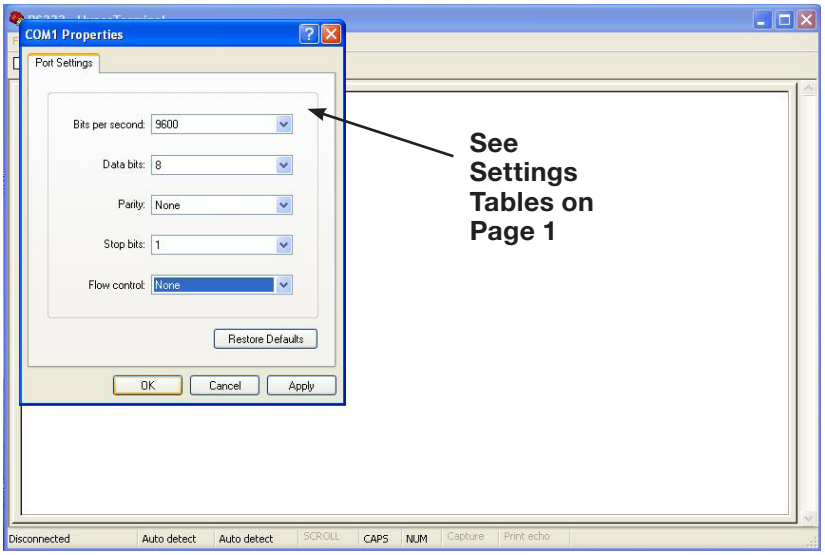
3

Select Port



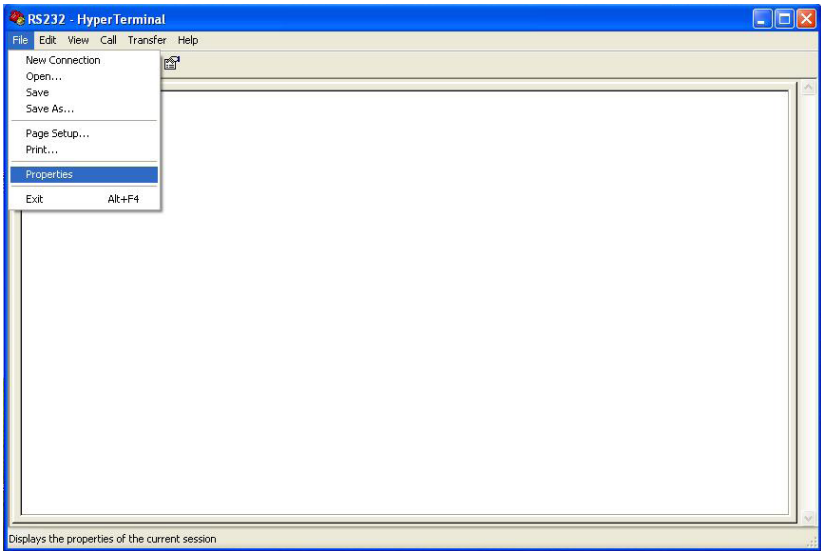
4

Set Communication Conditions. Click “Apply” then “OK”.



5

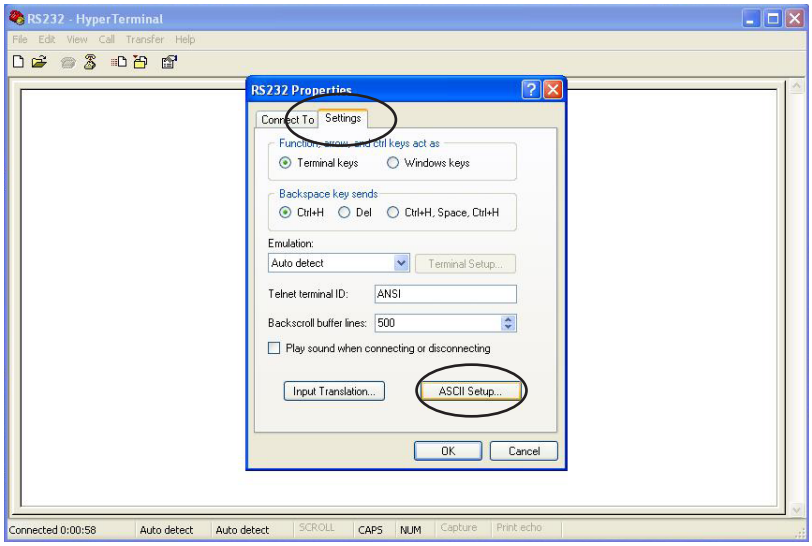
Select “File” then click “Properties”



6

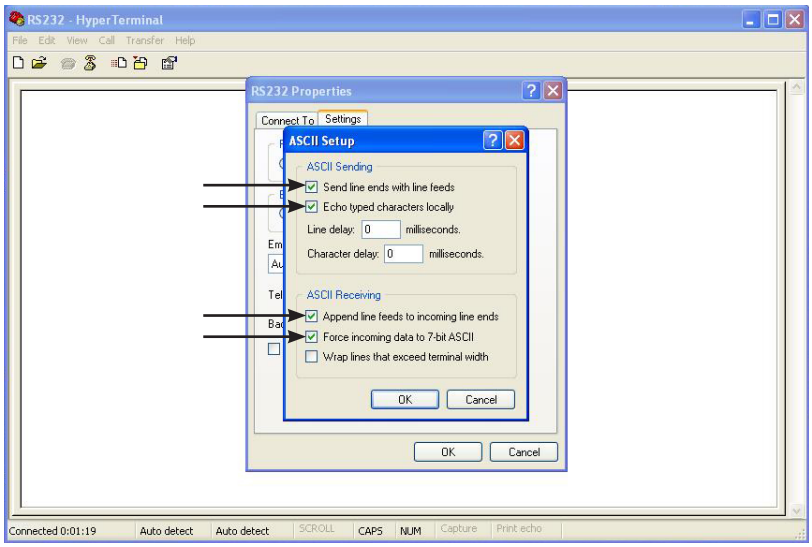
Select the Settings Tab

Click on “ASCII Setup”



7

Check the first four option boxes.

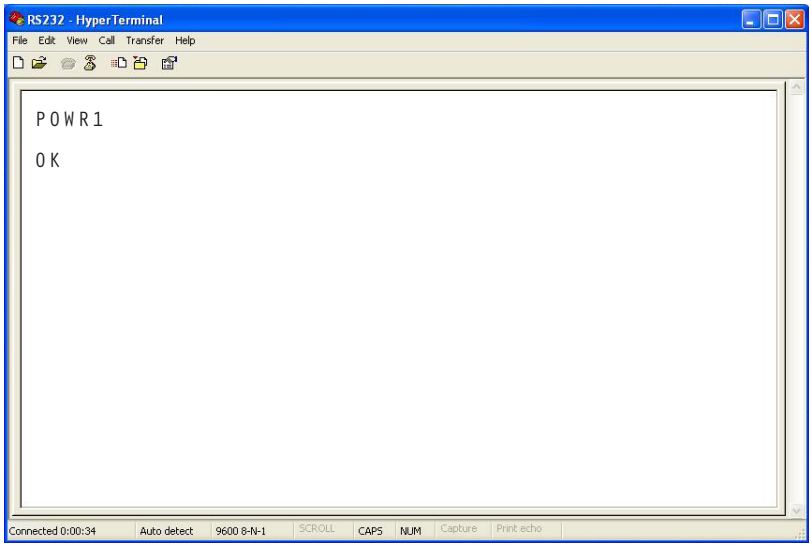


8

Enter Commands from the Command Table (page 2) using ALL CAPS, then press “ENTER”

Note: HyperTerminal adds the required carriage return and line feed automatically.

Note 2: The TV should respond with an “OK” or “ERR” message.

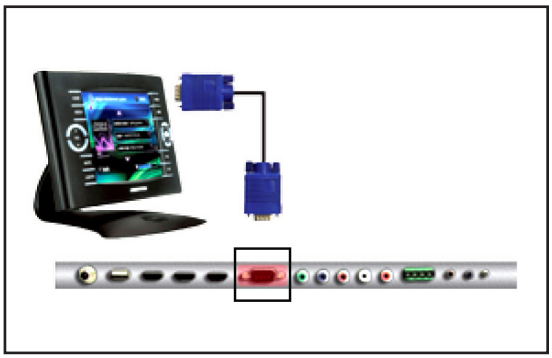


Introduction

The Séura S1 Series LCD displays can be controlled with RS-232 commands from a host (computer, system controller such as Crestron, Control4, Savant, etc.). This document describes the details of this protocol.

RS-232 Communication Protocol

This section describes the communication protocol used to control the Séura S1 Series remotely.



Note: Some commands will generate OSD feedback.

Note: IR Commands will generate serial feedback.

Connect a Host to the S1

Connect the S1 to the host controller using a crossed (null modem) serial cable or a straight-through cable with a null modem adapter.

Timing

General timing constraints:

- Wait 10 seconds after power ON command before sending next command.
- Wait for response (ACK message) before sending next command
- Minimum 2 seconds delay before resending a command if no response received.
- Minimum 500ms delay between commands.
- Minimum 5 seconds delay after sending 20 commands.

Séura S1 RS-232 Protocol

Command Structure

A Séura S1 RS-232 command consists of a header, an identifier, an optional separator and value and a terminator.

A command shall contain no spaces between fields.

A command always begins with an “&” (ampersand, no quote marks).

A command is always 9 bytes long including the carriage return. If the value field uses less than 3 bytes the missing characters shall be filled with “*” (asterisk, no quote marks).

Command Structure

Field	Description	Length	Comment
Header	ASCII character &	1 byte	Required
Identifier	Key identifier, case sensitive	3 bytes	Required
Separator	Character symbol (: or ?)	1 byte	Optional
Value	Value	3 bytes	Optional
Terminator	CR carriage return (0x0D)	1 byte	Required

Examples for identifiers: PWR, BAS, SRC

Separators:

: (colon) Value change. Value given will replace existing value
Example: &SRC:USB will change the input to USB

? (question mark) Get current value

Acknowledgement Structure

The S1 shall confirm each command it receives with an acknowledgement automatically. Acknowledgement is ON by default. Acknowledgement can be turned ON and OFF with the ECHO command.

An acknowledgement consists of a header, an identifier, a separator, a value and a terminator.

An acknowledgement always begins with a "%" (percent, no quote marks).

An acknowledgement is always 9 bytes long including the carriage return. If the value field uses less than 3 bytes the missing characters will be filled with "*" (asterisk, no quote marks).

Field	Description	Length	Comment
Header	ASCII character % (percent)	1 byte	Required
Identifier	Key identifier, case sensitive	3 bytes	Required
Separator	Character symbol : (colon)	1 byte	Optional
Value	Value	3 bytes	Optional
Terminator	CR carriage return (0x0D)	1 byte	Required

Error Messages

Most acknowledgements return the actual value of the requested command. If the requested command is not valid an error message will be returned instead.

An error message always begins with an "!" (exclamation mark, no quote marks).

Code	Error Message	Description
!ERR:001	Access denied	Command disabled by unit settings
		Example: Trying to switch to USB input while this input is disabled in Service Settings
!ERR:002	Not available	Command currently not available
		Example: Trying to change brightness while unit is in Input scan mode
!ERR:003	Not implemented	Command not implemented in this model
		Example: &SRC:VGA
!ERR:004	Value out of range	Value out of range
		Example: &SLP:080

RS-232 Examples

<CR> ASCII value carriage return, hex value 0x0D

Set Power ON

&	P	W	R	:	O	N	*	<CR>

&PWR:ON*<CR>

Acknowledge Power ON

%	P	W	R	:	O	N	*	<CR>

%PWR:ON*<CR>

Set Sleep Timer to 30 Minutes

&	S	L	P	:	0	3	0	<CR>

&SLP:030<CR>

Acknowledge Sleep Timer

%	S	L	P	:	0	3	0	<CR>

%SLP:030<CR>

Increment Volume

&	V	O	L	:	U	P	*	<CR>

&VOL:UP*<CR>

Acknowledge Volume

%	V	O	L	:	0	6	3	<CR>

%VOL:063<CR>

Increment Balance to Left

&	B	A	L	:	L	T	*	<CR>

&BAL:LT*<CR>

Acknowledge Balance

%	B	A	L	:	-	0	1	<CR>

%BAL:-01<CR>

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Function	Command (Tx)	ACK (Rx)
Power Toggle	&PWR:TOG	%PWR:TOG
Power ON Power OFF	&PWR:ON* &PWR:OFF	%PWR:ON* %PWR:OFF
Get Power Status OFF ON	&PWR?***	 %PWR:OFF %PWR:ON*
Boot set to ON Boot set to STANDBY Boot set to LAST	&BOT:ON* &BOT:SBY &BOT:LST	%BOT:ON* %BOT:SBY %BOT:LST
Get Boot Setup ON STANDBY LAST	&BOT?***	 %BOT:ON* %BOT:SBY %BOT:LST
Signal Loss 5 Sec Signal Loss 10 Sec Signal Loss 30 Sec Signal Loss 1 min Signal Loss 2 min Signal Loss OFF	&SLS:05s &SLS:10s &SLS:30s &SLS:001 &SLS:002 &SLS:OFF	%SLS:05s %SLS:10s %SLS:30s %SLS:001 %SLS:002 %SLS:OFF
Get Signal Loss Setup 5 Sec 10 Sec 30 Sec 1 min 2 min OFF	&SLS?***	 %SLS:05s %SLS:10s %SLS:30s %SLS:001 %SLS:002 %SLS:OFF
Sleep Timer 15 min Sleep Timer 30 min Sleep Timer 45 min Sleep Timer 60 min Sleep Timer 90 min Sleep Timer 120 min Sleep Timer OFF	&SLP:015 &SLP:030 &SLP:045 &SLP:060 &SLP:090 &SLP:120 &SLP:OFF	%SLS:015 %SLS:030 %SLS:045 %SLS:060 %SLP:090 %SLP:120 %SLP:OFF
Get Sleep Timer Status 15 min 30 min 45 min 60 min 90 min 120 min OFF	&SLP?***	 %SLP:015 %SLP:030 %SLP:045 %SLP:060 %SLP:090 %SLP:120 %SLP:OFF
Digit 1 Digit 2 Digit 3 Digit 4 Digit 5 Digit 6 Digit 7 Digit 8 Digit 9 Digit 0	&NUM:001 &NUM:002 &NUM:003 &NUM:004 &NUM:005 &NUM:006 &NUM:007 &NUM:008 &NUM:009 &NUM:000	%NUM:001 %NUM:002 %NUM:003 %NUM:004 %NUM:005 %NUM:006 %NUM:007 %NUM:008 %NUM:009 %NUM:000
OK Up Down Left Right	&CRS:OK* &CRS:UP* &CRS:DN* &CRS:LT* &CRS:RT*	%CRS:OK* %CRS:UP* %CRS:DN* %CRS:LT* %CRS:RT*
Volume + Volume - Get Volume Level	&VOL:UP* &VOL:DN* &VOL?***	%VOL:XXX [XXX]= [000]-[100]
Mute Toggle	&MUT:TOG	%PWR:TOG
Mute ON Mute OFF	&MUT:ON* &MUT:OFF	%MUT:ON* %MUT:OFF
Get Mute Status ON OFF	&MUT?***	 %MUT:ON* %MUT:OFF
Play Pause Stop Skip Forward / Chapter + Skip Backwards / Chapter - Fast Forward Fast Backward Exit	&FNC:PLY &FNC:PSE &FNC:STP &FNC:NXT &FNC:PRV &FNC:FWD &FNC:RWD &EXT:***	%FNC:PLY %FNC:PSE %FNC:STP %FNC:NXT %FNC:PRV %FNC:FWD %FNC:RWD %EXT:***
OSD Access ON OSD Access OFF	&OSA:ON* &OSA:OFF	%OSA:ON* %OSA:OFF
Get OSD Access Status Access ON Access OFF	&OSA?***	 %OSA:ON* %OSA:OFF

Function	Command (Tx)	ACK (Rx)
OSD Toggle	&OSD:TOG	%OSD:TOG
OSD ON (open) OSD OFF (close)	&OSD:ON* &OSD:OFF	%OSD:ON* %OSD:OFF
Get OSD Status ON OFF	&OSD?***	 %OSD:ON* %OSD:OFF
Input HDMI 1 Input HDMI 2 Input HDMI 3 Input Component Input USB / DMP	&SRC:HD1 &SRC:HD2 &SRC:HD3 &SRC:RGB &SRC:USB	%SRC:HD1 %SRC:HD2 %SRC:HD3 %SRC:RGB %SRC:USB
Get Input Status Component HDMI 1 HDMI 2 HDMI 3 USB / DMP	&SRC?***	 %SRC:RGB %SRC:HD1 %SRC:HD2 %SRC:HD3 %SRC:USB
Aspect 16:9 Aspect 4:3 Zoom 1 Zoom 2	&ASP:169 &ASP:043 &ASP:ZM1 &ASP:ZM2	%ASP:169 %ASP:043 %ASP:ZM1 %ASP:ZM2
Get Aspect Status 16:9 4:3 Zoom 1 Zoom 2	&ASP?***	 %ASP:169 %ASP:043 %ASP:ZM1 %ASP:ZM2
Picture Mode Standard Picture Mode User Picture Mode Dynamic Picture Mode Mild	&PCT:STD &PCT:USR &PCT:DYN &PCT:MLD	&PCT:STD &PCT:USR &PCT:DYN &PCT:MLD
Color Temp Cool Color Temp Medium Color Temp Warm	&PCT:COL &PCT:MED &PCT:WRM	%PCT:COL %PCT:MED %PCT:WRM
Brightness + Brightness - Get Brightness Level	&BRT:UP* &BRT:DN* &BRT?***	%BRT:XXX [XXX]=[000]-[100]
Contrast + Contrast - Get Contrast Level	&CON:UP* &CON:DN* &CON?***	%CON:XXX [XXX]= [000]-[100]
Color Saturation + Color Saturation - Get Saturation Level	&STR:UP* &STR:DN* &STR?***	%STR:XXX [XXX}=[000]-[100]
Sharpness + Sharpness - Get Sharpness Level	&SRP:UP* &SRP:DN* &SRP?***	%SRP:XXX [XXX]=[000]-[100]
Backlight + Backlight - Get Backlight Level	&BLT:UP* &BLT:DN* &BLT?***	%BLT:XXX [XXX]=[000]-[100]
Audio Mode Standard Audio Mode Music Audio Mode Movie Audio Mode Sports Audio Mode User	&AUD:STD &AUD:MUS &AUD:MOV &AUD:SPR &AUD:USR	%AUD:STD %AUD:MUS %AUD:MOV %AUD:SPR %AUD:USR
Bass + Bass - Get Bass Level	&BAS:UP* &BAS:DN* &BAS?***	%BAS:XXX [XXX]=[000]-[100]
Treble + Treble - Get Treble Level	&TRB:UP* &TRB:DN* &TRB?***	%TRB:XXX [XXX]=[000]-[100]
Balance Left Balance Right Get Balance Level	&BAL:LT* &BAL:RT* &BAL?***	%BAL:XXX [XXX]=[-50][000][+50]
Boot Volume Level + Boot Volume Level - Get Boot Volume Level	&BVL:UP* &BVL:DN* &BVL?***	&BVL:XXX [XXX]=[000]-[100]
Set RS232 Echo ON[1] Set RS232 Echo OFF[1]	&ECO:ON* &ECO:OFF	%ECO:ON* %ECO:OFF

[1] Echo-ON enables, Echo=OFF disables RS232 ACK messages

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