



MLC 104 MediaLink™ Controllers

Chapter Five

SIS™ Programming and Control

Host-to-MLC Communications

Command Tables

SIS™ Programming and Control

The MLC 104 Series controller can be remotely set up and controlled via a host computer or other device (such as a control system) attached to the rear panel Config/RS-232 port or LAN port, or the front panel Config port.

The MLC 104 or MLC 104 IP must be configured before use. As shipped the controller can trigger basic input switching but cannot control any other devices before being configured.

The MLC can be set up and controlled by using Extron's Simple Instruction Set (SIS) commands or the Extron Global Configurator software (version 2.0 or higher), and both of those methods can be accessed via RS-232 or Ethernet LAN connection. See chapter 2 for pin assignments and other details on the configuration and control ports. For information on the software and the MLC's embedded Web pages, see chapter four.

MLC's RS-232 protocol:

- 38400 baud
- 8 data bits
- 1 stop bit
- no parity
- no flow control

NOTE Both configuration ports require 38400 baud communication. This is a higher speed than many other Extron products use. The Global Configurator (version 2.0 or higher) software or MLC 226/104 control software automatically sets the connection for the appropriate speed. If using HyperTerminal or a similar application, make sure the PC or control system connected to these ports is set for 38400 baud.

LAN port defaults:

- MLC's IP address: 192.168.254.254
- gateway's IP address: 0.0.0.0
- subnet mask: 255.255.0.0
- DHCP: off

Host-to-MLC Communications

SIS commands consist of one or more characters per field. No special characters are required to begin or end a command sequence. When the MLC determines that a command is valid, it executes the command and sends a response to the host device. All responses from the MLC to the host end with a carriage return and a line feed (CR/LF = ↵), which signals the end of the response character string. A string is one or more characters.

MLC-initiated messages

If you are communicating with the MLC via RS-232 or via a verbose Telnet connection, when a local event such as a front panel selection or adjustment takes place, the MLC responds by sending a message to the host. No response is required from the host. The MLC-initiated messages are listed here (underlined).

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Day, DD Mon YYYY HH:MM:SS

Vx.xx is the firmware version number.

The MLC sends the boot and copyright messages under the following circumstances:

- If the MLC is off and an RS-232 connection is already set up (the PC is cabled to the MLC and a serial communication program such as HyperTerminal is open), the connected MLC sends these messages via RS-232 when it is first powered on.

- If the MLC is on, it sends the boot and copyright messages when you first open a Telnet connection to the MLC. You can see the day of the week, date, and time if the MLC is connected via Telnet, but not via RS-232. If you are using a Telnet connection, the copyright message, date, and time are followed by a password prompt.

Chn^[X] ↵ (where [X] is the input number)

The MLC sends this response when an input is switched.

Password information

The “↵ Password:” prompt requires a password (administrator level or user level) followed by a carriage return. The prompt is repeated if the correct password is not entered.

If the correct password is entered, the unit responds with “↵ Login Administrator↵” or “↵ Login User↵”, depending on password entered.

If passwords are the same for both administrator and user, the unit will default to administrator privileges.

Error responses

When the MLC receives a valid SIS command, it executes the command and sends a response to the host device. If the MLC is unable to execute the command because the command is invalid or it contains invalid parameters, it returns an error response to the host.

The error response codes and their descriptions are as follows:

E01 – Invalid input channel number (the number is too large)
 E12 – Invalid port number
 E13 – Invalid value (the number is out of range/too large)
 E14 – Not valid for this configuration
 E17 – System timed out
 E22 – Busy
 E24 – Privilege violation
 E25 – Device is not present
 E26 – Maximum number of connections has been exceeded
 E27 – Invalid event number
 E28 – Bad filename or file not found

Error response references

The following superscripted numbers are used within the command descriptions on the following pages to identify commands that may respond as shown:

¹⁴ = Commands that give an E14 (not valid for this configuration) response if the MLC’s current configuration doesn’t support that command

²² = Commands that yield an E22 (busy) response.

²⁴ = Commands that give an E24 (privilege violation) response if you are not logged in at the administrator level.

²⁷ = Commands that may yield an E27 (invalid event number) response.

²⁸ = Commands that may give an E28 (file not found) response.

Command Tables

Using the command/response tables

The MLC 104 IP can be controlled via either a Telnet (port 23) connection or a Web browser (port 80) connection. All MLC 104 Series models can be controlled via

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RS-232. The ASCII and URL commands listed in the tables starting on page 5-8 perform the same functions, but they are encoded differently to accommodate the requirements of each port (Telnet or browser).

The following ASCII to hexadecimal (HEX) conversion table is for use with the command/response tables.

ASCII to HEX Conversion Table																Esc 1B	CR 0D	LF 0A
20	!	21	"	22	#	23	\$	24	%	25	&	26	'	27	(	28	)	29
2A	*	2B	,	2C	-	2D	.	2E	/	2F								
30	0	31	1	32	2	33	3	34	4	35	5	36	6	37	7	38	8	39
3A	:	3B	;	3C	<	3D	=	3E	>	3F	?							
40	@	41	A	42	B	43	C	44	D	45	E	46	F	47	G	48	H	49
4A	J	4B	K	4C	L	4D	M	4E	N	4F	O							
50	P	51	Q	52	R	53	S	54	T	55	U	56	V	57	W	58	X	59
5A	Z	5B	[	5C	\	5D	]	5E	^	5F	_							
60	`	61	a	62	b	63	c	64	d	65	e	66	f	67	g	68	h	69
6A	j	6B	k	6C	l	6D	m	6E	n	6F	o							
70	p	71	q	72	r	73	s	74	t	75	u	76	v	77	w	78	x	79
7A	z	7B	{	7C	|	7D	}	7E	DEL	7F								

ASCII to Hex conversion table

The command/response tables list valid ASCII (for Telnet or RS-232) command codes, the corresponding URL (uniform resource locator) encoded (for Web browsers) command codes, the MLC's responses to the host, and a description of the command's function or the results of executing the command.

- Upper and lower case characters may be used interchangeably in the command field unless otherwise specified.
- Commands may be sent back-to-back without spaces (for example, 2!65V1Z).
- Numbers can be entered as 1, 2, or 3 digits, e.g., 8V = 08V = 008V.
- There are a few differences in how to enter the commands depending on whether you are using Telnet or a Web browser.
 - When using these commands through a Web browser, the URL reference is used to shorten the examples. "URL" refers to the full URL of the control interface and Web page reference including all path information (e.g., <http://192.168.100.10/myform.htm>).
 - To send any of the commands using a Web browser you must prefix them with the full URL followed by ?cmd=.
 - For control via a Web browser, all **non-alphanumeric characters** must be represented as the hexadecimal equivalent, %xx, where xx represents the two-character hex byte. For example, a comma (,) would be represented as %2C. Characters such as %, +, and the space character () must be encoded as hex bytes, or they will be misinterpreted by the MLC.
 - Some characters differ depending on the method you use to send the commands:

Telnet

Escape (hex 1B)

Carriage return (hex 0D)

Web browser

W [must **not** be hex encoded]

Pipe character (|) [must **not** be hex encoded]

NOTE

With Telnet you can use either an "Escape" command or a "W" command, and the carriage return or the pipe character. With the Web browser, you are required to use a "W" command and the pipe character.

In either method, {Data} = Data that will be directed to a specified port and **must** be hex encoded if non-alphanumeric.

NOTE

If you make adjustments (changes to volume, etc.), whether via the front panel or via RS-232 or IP communication, it will take 1 minute 40 seconds (100 seconds) for the data in the MLC's RAM to be saved to flash memory.

Symbol definitions

- ↵ = CR/LF (carriage return/line feed) (hex 0D 0A)
- ← = Carriage return (no line feed, hex 0D)
(use the pipe character, |, instead for Web browser commands)
- = Space character
- | = Pipe (vertical bar) character
- [Esc]** = Escape key (hex 1B)
(use **W** instead of Esc for Web browsers)
- [X1]** = Specific port number or relay number (01 – 99)
represented as two ASCII characters (two bytes)
Ports:
01 = rear host (Config/RS-232 port)
02 = front panel Config port
03 = slaved switcher (MLS port)
04 = projector port (Proj RS-232/IR)
- [X2]** = Command data section.
- NOTE** For Web encoding only: data will be directed to the specified port and **must** be encoded (URL encoding) if it is non-alphanumeric. Change any **non-alphanumeric** character (% , + , | , ← , etc.) within the data section into the corresponding hexadecimal equivalent, %xx, where xx represents the two-character hex byte. For example, a space (hex: 20) would be encoded as %20 (hex: 25 32 30) and a plus sign (hex: 2B) would be encoded as %2B or hex 25 32 42.
- [X3]** = Greenwich Mean Time (GMT) offset value
(-12.00 to +14.00) represents the time difference in hours and minutes (+/-hh:mm) relative to Greenwich, England. The leading zero is optional. For example, 5:30 = 05:30. Do not use a plus (+) sign if the GMT offset is positive.
- [X5]** = On/off status
0 = off/disable
1 = on/enable
- [X8]** = Volume level (0 – 100 steps). When no MLS is detected at the MLS port, the range is limited by the max. volume command (X*47#).
Default volume = 40 when no MLS switcher is detected at the MLS port.
Default volume = 100 when slave mode (X*41*) is active and an MLS switcher is detected at the MLS port.
- [X11]** = Version (typically listed to two decimal places, e.g., x.xx)
- [X12]** = MLC's name. The name is a text string of up to 24 characters drawn from the alphabet (A-Z), digits (0-9), and minus sign/hyphen (-). No blank or space characters are permitted as part of a name. No distinction is made between upper and lower case. The first character **must** be a letter. The last character **must not** be a minus sign/hyphen.
- [X13]** = **Local date and time format**
Set format (MM/DD/YY-HH:MM:SS).
Example: 01/18/05-10:54:00.
Read format (day of week, date month year HH:MM:SS). Example: Tue, 18 Jan 2005 18:19:33.
- [X14]** = IP address (xxx.xxx.xxx.xxx). Leading zeros in each of four fields are optional in setting values, and they are suppressed in returned values.
MLC's default: 192.168.254.254
- [X15]** = E-mail domain name; for example, *extron.com*

- [X17]** = Time in tens of milliseconds to wait until the *first* response character is received via a serial port before terminating the current receive operation (Default = 10 = 100 ms, max. = 32767.) The response includes leading zeros.

NOTE For commands that use both **[X17]** and **[X20]**, both variables must be zero or both must be non-zero. In the RS (send data) command, **[X20]** is optional.

- [X18]** = Hardware (MAC) address (xx-xx-xx-xx-xx-xx)
(00-05-A6-xx-xx-xx)
- [X19]** = Subnet mask (xxx.xxx.xxx.xxx). Leading zeros are optional in setting values in each of four fields, and they are suppressed in returned values.
Default = 255.255.0.0.
- [X20]** = Time in tens of milliseconds to wait *between* characters being received via a serial port before terminating the current command or receive operation. The response includes leading zeros.
(Default = 2 = 20 ms, max. = 32767)

NOTE For commands that use both **[X17]** and **[X20]**, both variables must be zero or both must be non-zero. In the RS (send data) command, **[X20]** is optional.

- [X21]** = Parameter (#L or #D) to set either the **Length** of message to receive or the **Delimiter** value.
= byte count (for L) or
= a single ASCII character expressed in decimal form (for D).
The parameter is case sensitive; you must use capital D or capital L.
Byte count # can be from 0 to 32767, default = 0.
The ASCII decimal # can be from 0 to 00255, default = 00000L.
Examples:
A 3-byte length = 3L.
A delimiter of ASCII 0A = 10D.
The response from the MLC will include leading zeros.

- [X22]** = Verbose/response mode status:
0 = clear/none, default for Telnet connections; responses are not echoed to the host
1 = verbose mode is on, default for RS-232 host control; responses are echoed to the host and displayed to the user
2 = send tagged responses for queries
3 = verbose mode is on and tagged responses are sent for queries

NOTE If tagged responses are enabled, all read commands return the constant string + data, the same as for setting a value. For example, for **[Esc]** CN ←, the response is **lpn• [X12]↵** rather than just the data.

- [X23]** = Priority status for receiving timeouts:
0 = use send data string command parameters (0 = default)
1 = use configure receive timeout command parameters
- [X24]** = IP address converted from four octets to a single decimal number; e.g.:
10.13.0.254 = [(10*256*256*256) + (13*256*256) + (0*256) + (254)] =
[(10*256³) + (13*256²) + (0*256¹) + (254*256⁰)] =
168,624,362 (decimal)

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- X25** = Baud rate: 300, 600, 1200, 1800, 2400, 3600, 4800, 7200, 9600, 14400, 19200, 28800, 38400, 57600, or 115200
- X26** = Parity (only the first letter is needed):
Odd
Even
None (default)
Mark
Space
- X27** = Data bits: 7, 8 (default = 8)
- X28** = Stop bits: 1, 2 (default = 1)
- X33** = Password (minimum length = 4 characters, maximum length = 12 characters, no special characters are allowed)
- NOTE** *A user password cannot be assigned if no administrator password exists; the E14 error code will be returned. If the administrator password is cleared, then the user password and all extended security level passwords are also removed.*
- X34** = Daylight saving time (DST) is a region-specific 1-hour offset that begins in spring and ends in fall. DST should be turned off in Hawaii, American Samoa, Guam, Puerto Rico, the Virgin Islands, the eastern time zone portion of the state of Indiana, and the state of Arizona (excluding the Navajo Nation).
0 = off/ignore
1 = USA on – starts on the first Sunday of April at 2 am and ends at 2 am on the last Sunday of October. For example, time in California is GMT -8:00 from April to October and GMT -7:00 from November to March.
2 = Europe on – begins on the last Sunday in March, ends on the last Sunday in October.
3 = Brazil on – beginning and ending dates vary from year to year (October through March or September through February). DST is not used in equatorial areas.
- X35** = Event number, range = 0 - 99 (valid only while events are running)
- X40** = I/O mode
0 = input
8 = power sensor (triggered when an input pulse starts/stops)
- X41** = Password to display on screen (response to password query). When the MLC connects to a host device via RS-232, the password (**X33**), itself, is the response. When the connection is via IP, **X41** is 4 asterisks (****) if a password has been assigned, or it is an empty field () if a password hasn't been assigned.
- X45** = E-mail event number or mailbox (1 - 64). The response will be two digits with a leading zero.
- X46** = E-mail recipient's address (e.g., *JDoe@extron.com*) for the person to whom messages will be sent.
- X47** = Name (numeral) of e-mail file to be sent
For CR (e-mail configuration) commands: *1.eml, 2.eml, ... 64.eml*; and within the file the first line contains the subject, the rest is the body of the e-mail.
For SM (e-mail sending) commands: *xxx*, where *xxx* = a number 1 to 999 corresponding to the e-mail's filename (*xxx.eml*). If *xxx* = 0 or no parameter is given, the MLC sends the file that was set via the CR command.
- NOTE** *If file **X47**.eml is not found when the SM command is executed, the MLC will send a default e-mail message.*
- X49** = Default name: a combination of the modelname and the last 3 pairs of the MLC's MAC address (e.g., MLC-104-IP-00-02-3D)
- X51** = Extended-security (password) levels (1 to 10). The response will be two digits with a leading zero.
- X52** = Connection's security level
0 = anonymous
1 - 10 = extended security levels 1 through 10
11 = user
12 = administrator
The response is two digits with a leading zero.
- X57** = IR playback file number (0 to 99) (no extension) The response includes leading zeros.
- X58** = IR playback function number (1 to 137). The response includes leading zeros. IR function numbers 0 and 127 or higher can return information only.
0 = return all data
129 = manufacturer
130 = model
131 = class
132 = remote
133 = creation date
134 = comments
137 = user file name (a descriptive name the user/installer gave the file)
- X59** = IR playback mode
0 = play once
1 = play continuously (send IR command again with mode = 0 to stop mode 1 playback)
- X69** = IP connection timeout period in seconds. Each step is specified in 10-second intervals (1 - 65000, default = 30 = 300 seconds). If no data is received during the specified period, the Ethernet connection will be closed. Responses are returned with leading zeros. This variable is applicable only when the MLC is connected via Ethernet. If the MLC is connected via RS-232 protocol, only the global timeout commands apply, and any commands involving **X69** return the E13 error response.
- X70** = The number to insert into an email message if a *____.eml* file has an embedded server-side include "`<!--#echo var = "WCR| " -->`" (the **[Esc]** ← command with no parameters.) The numeral is a 16-bit number to be employed as the user defines. This is an optional parameter. Use 0 as a placeholder if the optional **X47** variable is used but **X70** is not needed.
- X200** = Specific input number (1 - 4)
1 = input 1
2 = input 2
3 = input 3
4 = input 4
- X205** = Lamp hours elapsed (as a five-digit number, max. = 99999 hours) The response includes leading zeros. The default (99999 hours) is the response to SIS commands (via Telnet or RS-232) if elapsed lamp hours have not been set. In the MLC's internal Web pages, "N/A" is displayed if lamp hours have not been set.
- X206** = Voltage
- X207** = Temperature in degrees Celsius (the response is 3 digits including leading zeros)

-
- X208** = Display (projector on/off) status as tracked by the display driver
0 = display power is off
1 = display power is on
2 = display is powering down/off (cooling down)
3 = display is powering up/on (warming up)
- X209** = Front panel lockout (executive mode) status
0 = off/unlocked (default)
3 = on, disable/lock entire front panel (buttons, volume control) and optional connected SCP
- X210** = IR/serial port configuration
0 = IR ports (0 V – 5 V) (default)
1 = RS-232 ports (± 5 V)
- X211** = Status (in hexadecimal characters) of script or firmware button control. This variable is an 8-digit hexadecimal character calculated from a binary bit map. See page 5-27 for details.
- X212** = Status (in hexadecimal characters) of control of lamp enabling (control of all button lights). This variable is an 8-digit hexadecimal character calculated from a binary bit map. See page 5-29 for details.
- X213** = Power sensor status:
00 = power sensor is connected and is not sensing projector power (detector voltage is low, signal pin voltage is high)
01 = power sensor is connected and is sensing projector power (detector voltage is high)
02 = power sensor is disconnected or sensor is connected but the sensitivity is set too high (voltage is low at both the detector and signal pin)
- X214** = Power sensor signal pin status
00 = voltage is low
01 = voltage is high
Leading zeros will be used in responses to commands that use this variable.
- X215** = IR/Serial Output port number
1 = projector port
- X216** = Display mute or connection status
0 = off/disconnected
1 = on/connected
2 = unknown/unavailable

Command/response table for SIS commands

Command	ASCII (Telnet) (host to switcher)	URL Encoded (Web) (host to switcher)	Response (switcher to host)	Additional description
Input selection				
Select an input ^{14, 22}	[X200] !	[X200] %21	Chn [X200] ↵	Select input [X200] ([X200] = 1, 2, 3, 4) (audio and video). ¹⁴ = The MLC responds with an E14 error code (invalid for this configuration) if the desired input isn't part of the switching rotation (is not set up to switch inputs). Events are still triggered, though. ²² = The MLC sends a "busy" response (E22) if switching functions are locked.
Display (projector) power				
Turn display power on	1P	1P	Pwr [X208] ↵	On (discrete).
Turn display power off	0P	0P	Pwr [X208] ↵	Off (discrete).
View display power status	P	P	[X208] ↵	Show the display power status.
Example:	P	P	2↵	The display is powering off.
Set power status	[X208]*0P	[X208] %2A0P	Pwr [X208] ↵	This command is used only by scripts. It provides a way to set the power status to match the actual state of the projector. For [X208], 0 = display power is off 1 = display power is on 2 = display is powering down/off 3 = display is powering on (warming up).
Display mute				
Turn display mute on	1M	1M	Mut[X216] ↵	Mute. [X216] = 0 (off), 1 (on), or 2 (unknown)
Turn display mute off	0M	0M	Mut[X216] ↵	Unmute.
View display mute status	M	M	[X216] ↵	Show display mute status.
Set mute status	[X216]*0M	[X216] %2A0M	Mut[X216] ↵	This command is used only by scripts. It provides a way to set the status to match the actual state of the projector.

Command/response table for SIS commands (continued)

Command	ASCII (Telnet) (host to switcher)	URL Encoded (Web) (host to switcher)	Response (switcher to host)	Additional description
Volume adjustment (discrete, for volume mode = 0)				
Set the overall output volume ¹⁴	X8 V	X8 V	Vol X8 ↵	Specify the volume for audio output. ¹⁴ = The MLC responds with an E14 error code (invalid) if the MLC is in volume increment/decrement mode (vol. mode 1). X8 = volume level (0 to 100). Default = 40 if no switcher is connected, 100 if an MLC switcher is connected. The maximum level is limited by the X*47# command. <i>Example:</i> set volume to 27.
<i>Example:</i>	27V	27V	Vol027 ↵	Increase audio output.
Increment the volume	+V	%2BV	Vol X8 ↵	Decrease audio output.
Decrement the volume	-V	%2DV	Vol X8 ↵	Show the output volume.
View the volume level	V	V	X8 ↵	
Volume adjustment (increment/decrement, for volume mode = 1)				
Increment the volume	+V	%2BV	Vol+ ↵	Increase audio output.
Decrement the volume	-V	%2DV	Vol- ↵	Decrease audio output.
View the volume level	V	V	--- ↵	Show the output volume.
Audio mute				
Mute on	1Z	1Z	Amt1 ↵	Mute all audio outputs. This is not the same as selecting input 0.
Mute off	0Z	0Z	Amt0 ↵	Unmute all audio outputs.
View the audio mute status	Z	Z	X5 ↵	Show the status of audio mute. X5 = 0 (off) or 1 (on).
Front panel security lockdown modes (executive modes)				
Disable lockdown modes ²⁴	0X	0X	Exe 0 ↵	Default setting. Adjustments & selections can be made from the front panel in addition to via RS-232, Telnet, or Web browser. ²⁴ = The MLC responds with an E24 error (privilege violation) if the connected user is not logged in at administrator security level.

Command/response table for SIS commands (continued)

Command	ASCII (Telnet) (host to switcher)	URL Encoded (Web) (host to switcher)	Response (switcher to host)	Additional description
Enable lockout mode ^{3 24}	3X	3X	Exe 3 ↵	Lock <u>a</u> ll front panel selections and adjustments via MLC and SCP. Make selections, changes, and configure features via RS-232 or Ethernet only. All front panels in the control system are locked.
View the lockout mode status	X	X	[X209] ↵	Show lockout (executive mode) status. [X209] = 0 (off, unlocked) or 3 (front panels locked / disabled)
<i>Example:</i>	X		0 ↵	Executive mode is off.
Status commands				
View lamp hours status	6S	6S	[X205] * [X205] ↵	[X205] represents the number of elapsed hours of projector lamp use. The MLC responds with 2 sets of lamp hours. The number of elapsed hours are shown if a lamp's status is set. If a lamp's status has not been set, it is shown as the default (99999 hours).
Set lamp hours status for 1 lamp ²⁴	[X205]*6S	[X205]%/2A 6S	Lhr * [X205] * [X205] ↵	[X205] represents the five-digit numeric value for elapsed lamp use hours, and it is used by script to determine the number sent in response to the "view lamp hours" command (6S). ²⁴ = The MLC responds with an E24 error (privilege violation) if the connected user is not logged in at administrator security level.
Set lamp hours status for 2 lamps ²⁴	[X205] * [X205] * 6S	[X205]%/2A [X205]%/2A 6S	Lhr * [X205] * [X205] ↵	
View connection status	7S	7S	[X216] ↵	This command lets you know whether the MLC's scripts have determined if the display is still connected to the MLC. [X216] = 0 (disconnected), 1 (connected), or 2 (unknown)
Set projector connection status ²⁴	[X216]*7S	[X216]%/2A 7S	Pcs [X216] ↵	This command is used to reset the projector connection status flag ([X216]) used by scripts. 0 = projector not connected. 1 = projector is connected. 2 = undetermined status.

Command/response table for SIS commands (continued)

Command	ASCII (Telnet) (host to switcher)	URL Encoded (Web) (host to switcher)	Response (switcher to host)	Additional description
View power sensor status	8S	8S	<u>X213</u> ↵	<p>If the switcher is connected to an Extron Power Sensor that monitors the projector/display, this tells you whether the display is still powered on. <u>X213</u> is as follows:</p> <p>00 = power sensor is connected and is not sensing projector power (detector voltage is low, signal pin voltage is high).</p> <p>01 = power sensor is connected and sensing projector power (detector voltage is high).</p> <p>02 = sensor is disconnected or sensor is connected but sensitivity is too high (voltage is low at both the detector and signal pin).</p>
View power sensor signal pin status	9S	9S	<u>X214</u> ↵	<p>Power sensor signal pin status:</p> <p>00 = voltage is low.</p> <p>01 = voltage is high.</p>
View all voltage & temp. status	11S	11S	<i>responses from commands 12S•14S•16S•20S</i> ↵	<p>View all voltages and the MLC's internal temperature at once.</p>
View +12 V power supply voltage	12S	12S	+ <u>X206</u> ↵	<p>Display the operating voltage of the MLC's power input. <u>X206</u> = voltage.</p>
View +3.3 V IP Link/FPGA voltage	14S	14S	+ <u>X206</u> ↵	
View -10 V IR/Serial bus voltage	16S	16S	- <u>X206</u> ↵	<p>Display the operating voltage for the IR/Serial and projector ports.</p>
View internal temperature status	20S	20S	<u>X207</u> ↵	<p>Display the internal operating temperature. <u>X207</u> = temperature in degrees Celsius (the response is 3 digits including leading zeros).</p>

Command/response table for SIS commands (continued)

Command	ASCII (Telnet) (host to switcher)	URL Encoded (Web) (host to switcher)	Response (switcher to host)	Additional description
Serial data port configuration and use				
These commands apply to any port that uses RS-232 communication: both 1-way (output) and 2-way (bidirectional) RS-232 communication.				
Send data string	<code>[Esc] [X1]*[X17]*[X20]*[X21]RS<--[X2]</code> <code>W[X1]%2A[X17]%2A[X20]%2A[X21]RS|[X2]</code>			
NOTE	* [X17]*[X20]*[X21] is optional. If [X17] and [X20] are not specified, the default values are used. For this command, [X17] and [X20] must both a) be missing, b) equal zero, or c) be nonzero.			
NOTE	[X1] = specific port number (01 – 99) 01 = rear host (Config/RS-232 port) 02 = front panel Config port 03 = slaved switcher (MLS port) 04 = projector port (Proj RS-232/IR) [X2] = command data section. For Web encoding for [X2] , convert nonalphanumeric characters to hex numbers. A space (hex = 20) is encoded as %20. A plus sign (hex = 2B) is encoded as %2B. Example: <code>[Esc] 04*4*7*3L RS <--<data></code> <code>W04%2A4%2A7%2A3L RS|<data></code>			
	[X17] = time in tens of ms for the MLC to wait until receipt of the first response character before terminating the current receive operation (default = 10 = 100 ms, max. = 32767). The response includes leading zeros. [X20] = time in tens of ms for the MLC to wait between characters being received via a serial port before terminating the current receive operation (default = 2 = 20 ms, max. = 32767). The response includes leading zeros. [X21] = #L or #D. The letter parameter is case sensitive (requires a capital "D" or capital "L"). The response includes leading zeros. L = Length of the message to be received. D = Delimiter value. # = byte count (for L) or a single ASCII character expressed in decimal form (for D). Byte count # can be from 0 to 32767, default = 0. The ASCII decimal delimiter # value can be from 0 to 00255, default = the byte count. Examples: A 3-byte length = 3L. A delimiter of ASCII 0A = 10D.			

Command/response table for SIS commands (continued)

Command	ASCII (Telnet) (host to switcher)	URL Encoded (Web) (host to switcher)	Response (switcher to host)	Additional description
Configure serial port parameters ^{2,4}	<code>[Esc] [X1]*[X25], [X26] [X27] [X28]CP ←</code>	<code>W[X1]%/2A[X25]%/2C[X26]%/2C[X27]%/2C[X28]CP|</code>	<code>Cpn [X1]•Ccp [X25] [X26] [X27] [X28] ↓</code>	Set baud rate (<u>[X25]</u>), parity (<u>[X26]</u>), data bits (<u>[X27]</u>), and stop bits (<u>[X28]</u>) for port <u>[X1]</u> . [X25] = 300, 600, 1200, 1800, 2400, 3600, 4800, 7200, 9600, 14400, 19200, 28800, 38400, 57600, or 115200 baud. [X26] = parity (only the first letter is needed): <u>O</u> dd <u>E</u> ven <u>N</u> one (default) <u>M</u> ark <u>S</u> pace. [X27] = data bits: 7, 8 (default = 8). [X28] = stop bits: 1, 2 (default = 1).
<i>Example:</i>	<code>[Esc]4*9600,N,8,1CP ←</code>	<code>W4%/2A9600%2CN%2C8%2C1CP|</code>	<code>Cpn4•Ccp9600,N,8,1 ↓</code>	Set the projector control port for 9600 baud, no parity, 8 data bits, and 1 stop bit.
View serial port parameters	<code>[Esc] [X1] CP ←</code>	<code>W[X1]CP|</code>	<code>[X25] [X26] [X27] [X28] ↓</code>	
Configure receive timeout ^{2,4}	<code>[Esc] [X1]*[X17]*[X20]*[X23]*[X21] CE ←</code>	<code>W[X1]%/2A[X17]%/2A[X20]%/2A[X23]%/2A[X21]CE|</code>	<code>Cpn [X1]•Cce[X17] [X20] [X23] [X21] ↓</code>	Set the time to wait (<u>[X17]</u> = waiting time in tens of ms until receipt of the first response character before terminating the receive operation, <u>[X20]</u> = waiting time in tens of ms between characters before terminating) and priority status (<u>[X23]</u> : 0 = default, use send data string command parameters; 1 = use configure receive timeout command parameters) for port <u>[X1]</u> . <u>[X21]</u> = #L or #D (see previous page). The response includes leading zeros.
View receive timeout	<code>[Esc] [X1] CE ←</code>	<code>W[X1]CE|</code>	<code>[X17] [X20] [X23] [X21] ↓</code>	

Command/response table for SIS commands (continued)

Command	ASCII (Telnet) (host to switcher)	URL Encoded (Web) (host to switcher)	Response (switcher to host)	Additional description
IR/serial data port				
Send an IR command ²⁸	<code>[Esc] [X215] [X57] [X58] [X59] IR ←</code> W[X215]%2C[X57]%2C[X58]%2C[X59] IR |		Is [X215] [X57] [X58] [X59] ↓	Send an IR command via IR/Serial Output port number [X215] (1 = projector port). [X57] = the IR file number (0-99), [X58] = IR function number (1-137), [X59] = IR playback mode (0 = play once, 1 = play continuously). Also, the response includes leading zeros.
NOTE To stop mode 1 IR command playback (continuous playback), send the IR command again but with playback mode ([X59]) = 0.				
Get IR command info ²⁸	<code>[Esc] [X57] [X58] IR ←</code> W[X57]%2C[X58] IR |		{descriptive text} ↓	The response to this command is the name/description (e.g., Power On, Power Off, Enter, Play, Stop, RGB, Menu) of the specific command you ask about. [X57] = the IR file number (0-99), as in files 1.eir, 2.eir, 3.eir, etc. stored in the controller. Each ____-eir file contains commands for a specific device. [X58] = IR function number (1-137), which corresponds to a specific function/command set contained within the file. If [X58] = 0, the MLC will return all data. See page 5-6 for additional details on [X58]. [X59] = IR playback mode. Command/function 1 in file 3.eir is the Power command. Command/function 2 in file 3.eir is not defined or does not exist, so the controller returns E13, the invalid value error number.
NOTE An IR driver must be loaded into the MLC before IR command information can be read.				
Configure an IR/Serial Out port ²⁴	<code>[Esc] [X215]*[X210] IC ←</code> W[X215]%2A[X210] IC |		Is [X215]*[X210] ↓	This command sets IR/Serial Output port number [X215] (1 = projector port) for either IR ([X210] = 0) or RS-232 ([X210] = 1) output.
View an IR/Serial port's config.	<code>[Esc] [X215] IC ←</code> W[X215] IC |		[X210] ↓	[X210] includes a placeholder zero in the response.
Example:	<code>[Esc] 1 IC ←</code> W1 IC |		01 ↓	View the projector port's configuration, which is RS-232 in this example.

Command/response table for SIS commands (continued)

Command	ASCII (Telnet) (host to switcher)	URL Encoded (Web) (host to switcher)	Response (switcher to host)	Additional description
Ethernet data port configuration and use				
Set global IP port timeout period ²⁴	[Esc] 1* [X69] TC ←	W1%2A [X69] TC |	Pti 1* [X69] ↓	The global port timeout is the default timeout period for all Telnet sessions. [X69] = IP connection timeout period in seconds. Each step is specified in 10-second intervals (1 - 65000, default = 30 = 300 seconds). If no data is received during the specified period, the Ethernet connection will be closed. Responses are returned with leading zeros. This variable is applicable only when the MLC is connected via Ethernet, and you must be logged in as an administrator to change this setting.
View global IP port timeout period	[Esc] 1TC ←	W1TC |	[X69] ↓	The current port timeout period applies to the currently open Telnet session only. When you start another Telnet session, it uses the default global port timeout period. [X69] = timeout period in seconds. See the description above. This variable is applicable only when the MLC is connected via Ethernet. If the MLC is connected via RS-232 protocol, only the global timeout commands apply, and any commands involving [X69] return the E13 error response.
Set current port's timeout period ²⁴	[Esc] 0* [X69] TC ←	W0%2A [X69] TC |	Pti 0* [X69] ↓	
View current port's timeout period	[Esc] 0TC ←	W0TC |	[X69] ↓	

Command/response table for SIS commands (continued)

Command	ASCII (Telnet) (host to switcher)	URL Encoded (Web) (host to switcher)	Response (switcher to host)	Additional description
Digital input data port (power sense port)				
NOTE An input voltage below 1.2 VDC is considered to be logic low. An input voltage above 1.2 VDC is considered to be logic high. These thresholds are not adjustable.				
Set the input (I) mode ²⁴	2* [X40][	2%2A[X40]%5B	Iom 2*[X40]↵	Set the input/output mode ([X40]). [X40] = 0 = input (default) 8 = power sensor When set for power sensor, the input state is triggered when the input pulse starts or stops at the power sense port.
View the digital input mode	2[	2%5B	[X40]↵	
View the digital input state	2]	2%5D	↵	[X43] = digital input state: 0 = off 1 = on
Firmware version, part number & information requests				
Query firmware version number	Q or 1Q	Q or 1Q	[X11]↵	Show the MLC's firmware version ([X11]) to two decimal places. This query yields the number of the currently running version of the user-updatable firmware.
Example:	1Q	1Q	1.01	
Query verbose version information	0Q	0Q	[response from 2Q]–[response from 4Q]↵	Show the bootstrap, factory-installed, and updated firmware versions. See 2Q, 3Q, and 4Q below.
Example:	0Q	0Q	1.03-1.00(1.18-MLC104 -Thu, 20 Jan 2005 09:41:47 GMT)-1.00*(1.18-MLC104 -Thu, 15 Sep 2005 22:42:14 GMT)↵	
Query bootstrap firmware version	2Q	2Q	[X11]↵	The bootstrap firmware is not user-replaceable, but you may need this information during troubleshooting.
Example:	2Q	2Q	1.03↵	
Query factory firmware version	3Q	3Q	[X11](kernel version–model description–date time of upload)↵	Factory-installed firmware is different from the bootstrap firmware, but it is also not user-replaceable. This firmware was installed at the factory; it is the version the controller reverts to after a mode 1 reset (see chpt. 2).
Example:	3Q	3Q	1.00(1.18-MLC104 -Thu, 20 Jan 2005 09:41:47 GMT)↵	In this example the factory firmware version is 1.00 and the IP Link kernel version is 1.18 for the MLC 104, dated 20 January 2005.

Command/response table for SIS commands (continued)

Command	ASCII (Telnet) (host to switcher)	URL Encoded (Web) (host to switcher)	Response (switcher to host)	Additional description
Query updated firmware version	4Q	4Q	<u>X11</u> (kernel version—model description—date time of upload)↵	Use this command to find out which version of the firmware, if any was uploaded into the controller after it left the factory.
Example:	4Q	4Q	1.00*(1.18-MLC104 -Thu, 15 Sep 2005 22:42:14 GMT)↵	In this example the current firmware version is 1.00, the IP Link kernel version is 1.18, for the MLC 104, dated 15 September, 2005.
<p>NOTE In a query response, an asterisk (*) after the version number indicates the version that is currently used.</p> <p>A question mark (?) or ?..?? indicates that the factory default firmware is the only firmware loaded in the switcher.</p> <p>A carat (^) indicates the version of firmware that should be running, but, since a mode 1 reset was performed, the factory default firmware version is loaded and running instead.</p> <p>An exclamation point (!) indicates that the firmware is corrupted.</p>				
Query FPGA version	32Q	32Q	<u>X11</u> ↵	Show the field-programmable gate array (FPGA) firmware version to two decimal places (x.xx).
Request the MLC's part number	N	N	60-xxx-00↵	Show the MLC's part #: 60-573-00 = MLC 104 IP, 60-665-00 = MLC 104.
Request A/V input number	I	I	Chn <u>X200</u> ↵	Show which input is active (selected). <u>X200</u> is the input number.
Request the model name	1I	1I	MLC 104 IP↵ or MLC 104↵	MLC 104 with IP control.
Request the model description	2I	2I	MLC 104 w/ IP↵	
Request system memory usage	3I	3I	# bytes used out of # of kbytes	Show amount of memory used and total available memory for system operations.
Request user memory usage	4I	4I	# bytes used out of # of kbytes↵	Show amount of user memory used and total available user memory.
Example:			217856 Bytes Used out of 7232 KBytes	
Request status of attached hardware	32I	32I	P1##•P2##•K1##•K2##•K3##•K4##•S**↵	Show the absence of or types of connected devices.
<p>Prefixes for connected devices:</p> <p>P1 = SCP #1, address 0</p> <p>P2 = SCP #2, address 1</p> <p>K1 = control module #1, address 0*</p> <p>K2 = control module #2, address 1*</p> <p>K3 = control module #3, address 2*</p> <p>K4 = control module #4, address 3*</p> <p>S = MediaLink device, typically a slaved MLC switcher.</p>				
<p>For ##:</p> <p>00 = not present</p> <p>*00 is the value (##) for K1, K2, K3, and K4 for the MLC 104 Series because they do not support control modules (IRCMs, ACMs, CCs, RCMs)</p>				
<p>For **:</p> <p>08 = MLC 103 SV</p> <p>09 = MLC 102 V/GA</p> <p>01 = MLC 306</p> <p>02 = MLC 506</p> <p>03 = MLC 506 MA 70 V</p> <p>04 = MLC 506 SA</p> <p>05 = MLC 506 MA 100 V</p> <p>06 = MLC 100 A</p> <p>07 = MLC 103 V</p>				

Command/response table for SIS commands (continued)

Command	ASCII (Telnet) (host to switcher)	URL Encoded (Web) (host to switcher)	Response (switcher to host)	Additional description
<i>Examples:</i>	32I	32I	P101 P200 K100 K200 K300 K400 S00 ↵	This example includes one SCP (P101) and no slaved switcher.
	32I	32I	P100 P201 K100 K200 K300 K400 S09 ↵	This example includes one SCP (P201) and an MLS 102 VGA (S09).
IP setup commands				
Set the unit name ²⁴	Esc X12 CN ↵	W%X12|CN|	Ipn•X12 ↵	Change the MLC's name to one of your choosing (X12), such as "AuditoriumMLC", "Rm316-AVcenter", or "exec-boardroom-ctrl". The name consists of up to 24 alphanumeric characters (and the minus sign). The first character must be a letter, the last character cannot be a minus sign (hyphen). Case does not matter.
Set unit name to factory default ²⁴	Esc •CN ↵	W%20CN|	Ipn•X49 ↵	X49 = the name the MLC was shipped with: MLC-104-IP-##-##-## or MLC-104-##-##-##, a combination of the model name and the last 3 pairs of hex numbers in the controller's MAC address (e.g., MLC-104-IP-00-02-3D).
Read the unit name	Esc CN ↵	WCN|	X12 ↵ or X49 ↵	X12 is the MLC's current, user-defined unit name.
Set time/date ²⁴	Esc X13 CT ↵	W%X13|CT|	Ipt•X13 ↵	X49 is the MLC's factory default name. X13 = Local date and time format. The set format is MM/DD/YY-HH:MM:SS. Example: 03/08/05-10:54:00.
Read time / date	Esc CT ↵	WCT|	X13 ↵	X13 = Local date and time format. The Read format is day of week, DD month year HH:MM:SS. Example: Tue, 08 Mar 2005 18:19:33.

Command/response table for SIS commands (continued)

Command	ASCII (Telnet) (host to switcher)	URL Encoded (Web) (host to switcher)	Response (switcher to host)	Additional description
Set GMT offset ²⁴	Esc X3 CZ ←	W X3 CZ|	lpz X3 ↓	Set the Greenwich Mean Time (GMT) offset value (X3) for the MLC's location. GMT offset (-12.00 to +14.00) represents the time difference in hours and minutes (+/-hh:mm) relative to Greenwich, England. The leading zero is optional. For example, 5:30 = 05:30. Do not use a plus (+) sign if the GMT offset is positive.
Read GMT offset	Esc CZ ←	WC|	X3 ↓	
Set daylight saving time ²⁴	Esc X34 CX ←	W X34 CX|	lpx X34 ↓	X34 = Daylight saving time (DST) is a region-specific 1-hour offset that begins in spring and ends in fall. DST should be turned off in Hawaii, American Samoa, most equatorial regions, Guam, Puerto Rico, the Virgin Islands, the eastern time zone portion of the state of Indiana, and the state of Arizona (excluding the Navajo Nation). 0 = off/ignore 1 = USA on – starts on the first Sunday of April at 2 am and ends on the last Sunday of October. For example, time in California is GMT -8:00 from April to October and GMT -7:00 from November to March. 2 = Europe on – begins on the last Sunday in March, ends on the last Sunday in October. 3 = Brazil on – beginning and ending dates vary from year to year. DST is not used in equatorial areas.
Read daylight saving time	Esc CX ←	WC|	X34 ↓	
Set DHCP on ²⁴	Esc 1 DH ←	W1DH|	ldh 1 ↓	
Set DHCP off ²⁴	Esc 0 DH ←	W0DH|	ldh 0 ↓	
View DHCP mode	Esc DH ←	WDH|	X5 ↓	X5 = 0 (off) or 1 (on).
Set IP address ²⁴	Esc X14 CI ←	W X14 CI|	lpi • X14 ↓	X14 = IP address (xxx.xxx.xxx.xxx). Leading zeros in each of the four fields are optional in setting values.
Read IP address	Esc CI ←	WC|	X14 ↓	Leading zeros in each of the four fields are suppressed in returned values.
Read hardware address (MAC)	Esc CH ←	WCH|	X18 ↓	X18 = hardware (MAC) address (xx-xx-xx-xx-xx-xx).

Command/response table for SIS commands (continued)

Command	ASCII (Telnet) (host to switcher)	URL Encoded (Web) (host to switcher)	Response (switcher to host)	Additional description
Set subnet mask ²⁴	Esc X19 CS ←	W X19 CS|	Ips • X19 ↵	X19 = subnet mask (xxx.xxx.xxx.xxx). Syntax is the same as for IP addresses. Leading zeros are optional in setting values.
Read subnet mask	Esc CS ←	WCS|	X19 ↵	Leading zeros are suppressed.
Set gateway IP address ²⁴	Esc X14 CG ←	W X14 CG|	Ipg • X14 ↵	X14 = IP address (xxx.xxx.xxx.xxx). Leading zeros are optional
Read gateway IP address	Esc CG ←	WCG|	X14 ↵	
Set verbose response mode on/off ²⁴	Esc X22 CV ←	W X22 CV|	Vrb X22 ↵	Enable or disable the verbose mode via this command. For X22 : 0 = clear/none, default for Telnet connections; responses are not echoed to the host 1 = verbose mode is on, default for RS-232 host control; responses are echoed to the host and displayed to the user 2 = send tagged responses for queries 3 = verbose mode is on and tagged responses are sent for queries. For example, for Esc CN ←, the response is Ipn • X12 ↵
<p>NOTE If tagged responses are enabled, all read commands return the constant string + data, the same as for setting a value.</p> <p>NOTE The controller can send out unsolicited information (such as notice of a volume or input change or a change in some other setting). That is called a verbose (wordy) relationship between the controller and a connected device. For a direct RS-232 connection, the controller is set for verbose mode by default. When connected via Ethernet, verbose mode is disabled (by default) in order to reduce the amount of communication traffic on the network. If you want to use the verbose mode with a controller connected via Ethernet, this mode must be set to “on” each time you reconnect to the controller.</p>				
Read verbose mode status	Esc CV ←	WCV|	X22 ↵	
Get a connection listing	Esc CC ←	WCC|	[total number of client connections] ↵	
Example:	Esc CC ←	WCC|	002 ↵	Example: This shows two client connections.
Password and security settings				
Read connection's security level	Esc CK ←	WCK|	X92 ↵	For X92 : 00 = anonymous 01 – 10 = extended security levels 1 through 10 11 = user 12 = administrator The response is two digits with a leading 0.

Command/response table for SIS commands (continued)

Command	ASCII (Telnet) (host to switcher)	URL Encoded (Web) (host to switcher)	Response (switcher to host)	Additional description
Set administrator password ²⁴	CA	W CA|	Ipa •	Set the administrator access password (, 4 to 12 alphanumeric characters). The password is case sensitive. Special characters (spaces, symbols) are not allowed. = Password to display on screen (response to password query). When the MLC connects to a host device via RS-232, the password (, itself, is the response. When the connection is via IP, is 4 asterisks (****) if a password has been assigned, or it is an empty field () if a password hasn't been assigned.
Clear administrator password ²⁴	• CA	W%20CA|	Ipa •	Clear/remove all passwords (administrator and user).
NOTE A user password cannot be assigned if an administrator password does not exist. Also, if the administrator password is cleared, the user password is also cleared.				
Read administrator password	CA	WCA|		Set the user password (is 4 to 12 alphanumeric characters). The password is case sensitive. Special characters (spaces, symbols) are not allowed. = Password to display on screen.
Set user password ^{14, 24}	CU	W CU|	Ipu •	
NOTE A user password cannot be assigned if an administrator password does not exist. Also, if the administrator password is cleared, the user password is also cleared.				
Clear user password ²⁴	• CU	W%20CU|	Ipu •	This clears the user password only.
Read user password	CU	WCU|		

Command/response table for SIS commands (continued)

Command	ASCII (Telnet) (host to switcher)	URL Encoded (Web) (host to switcher)	Response (switcher to host)	Additional description
Remapping port designations For security reasons the network administrator may wish to assign new/different port numbers to the controller's Telnet, Web browser, and direct access ports or to disable one or more ports. Typically Telnet uses port 23, Web access is via port 80 (HTTP), and direct access is via port 2001.				
CAUTION Do not set two or more ports to the same port number. Setting two ports to the same number could cause networking conflicts and will also result in an E13 (invalid parameter) error.				
Set the Telnet port map ²⁴	Esc {port#}|MT↔	W{port#}|MT|	Pmt {port#}↔	Select a number for the port that will not conflict with any other ports.
Reset the Telnet port map ²⁴	Esc 23MT↔	W23MT|	Pmt 00023↔	This resets the Telnet port to port 23.
Disable the Telnet port map ²⁴	Esc 0MT↔	W0MT|	Pmt 00000↔	Setting the port number to 0 disables the port.
Read the Telnet port map	Esc MT↔	WMT|	{port#}↔	
Set the Web port map ²⁴	Esc {port#}|MH↔	W{port#}|MH|	Pmh {port#}↔	
Reset the Web port map ²⁴	Esc 80MH↔	W80MH|	Pmh 00080↔	This resets the Web port to port 80.
Disable the Web port map ²⁴	Esc 0MH↔	W0MH|	Pmh 00000↔	
Read the Web port map	Esc MH↔	WMH|	{port#}↔	
Set the Direct Access port map ²⁴	Esc {port#}|MD↔	W{port#}|MD|	Pmd {port#}↔	
Reset the Direct Access port map ²⁴	Esc 2001MD↔	W2001MD|	Pmd 02001↔	This resets the direct access port to port 2001.
Disable the Direct Access port ²⁴	Esc 0MD↔	W0MD|	Pmd 00000↔	
Read the Direct Access port map	Esc MD↔	WMD|	{port#}↔	

Command/response table for SIS commands (continued)

Command	ASCII (Telnet) (host to switcher)	URL Encoded (Web) (host to switcher)	Response (switcher to host)	Additional description
Directory commands				
Change or create a directory	Esc directorypath/CJ ↵ W directorypath%2F CJ |		Dir • directorypath/ ↵	The directory's name must be composed of alphanumeric characters and may include the minus sign (hyphen, -). The first character must be a letter. Case does not matter. No blank or space characters are permitted in the name. Include the <u>full path</u> , not just the name of the directory. Nonalphanumeric characters in the path (e.g. /) must be encoded to hex. characters for use with a Web browser.
NOTE A directory does not nully exist until a file has been copied into that path. Also, the MLC operates differently from PC operating systems: files stored in and directories created in the MLC may have the same names.				
	Example: Esc majordirectory/subdirectory/next-level/ CJ ↵ W majordirectory%2Fsubdirectory%2Fnext-level%2F CJ |		Dir • majordirectory/subdirectory/next-level/ ↵	In this case, the path is <i>majordirectory/subdirectory/next-level</i> . The directory that was just created or changed to is called <i>next-level</i> .
Example:	Esc custompages/HTMLfiles/ CJ ↵ W custompages %2F HTMLfiles %2F CJ |		Dir • custompages/HTMLfiles/ ↵	This example just created a subdirectory for storing the user's custom-made HTML files. The directory that was just created is called <i>HTMLfiles</i> .
	Example: Esc oak/ CJ ↵ W oak%2F CJ |		Dir • oak ↵	
Change back to the root directory	Esc / CJ ↵ W %2F CJ |		Dir • / ↵	
Go up one directory level	Esc .. CJ ↵ W %2E%2E CJ |		Dir • directorypath/ ↵	
View the current directory	Esc CJ ↵ WCJ |		directorypath/ ↵	
NOTE The current directory is determined on a per-connection basis. At the beginning of each IP connection/session, the current directory is selected as the root directory .				

Command/response table for SIS commands (continued)

Command	ASCII (Telnet) (host to switcher)	URL Encoded (Web) (host to switcher)	Response (switcher to host)	Additional description
File handling commands				
Erase the user-supplied Web page and files ^{24,28}	[Esc] filename EF ←	Wfilename EF|	Del • filename ↓	
Erase the current directory and its files ^{24,28}	[Esc] / EF ←	W%2F EF|	Ddl ↓	
Erase the current directory and its subdirectories ^{24,28}	[Esc] // EF ←	W%2F%2F EF|	Ddl ↓	
List files from the current directory	[Esc] DF ←	WDF|		<p>Retrieve a list of files stored in the controller. Each line of the response lists a different filename and its corresponding file size. The last line of the response indicates how much available file space there is.</p> <pre> [filename 1] • [day, date time] GMT • [file size 1] ↓ [filename 2] • [day, date time] GMT • [file size 2] ↓ [filename 3] • [day, date time] GMT • [file size 3] ↓ ... [filename n] • [day, date time] GMT • [file size n] ↓ [space remaining (to 7-digits)] • Bytes Left ↓ ↓ var file=new Array(); file[1]="[filename 1],[day, date time1] GMT,[file size 1]"; ↓ file[2]="[filename 2],[day, date time2] GMT,[file size 2]"; ↓ file[3]="[filename 3],[day, date time3] GMT,[file size 3]"; ↓ ... file[n]="[filename n],[day, date time] GMT,[file size n]"; ↓ file[n+1]="[space remaining (to 7-digits)] Bytes Left; ↓ 4.evt Tue, 01 Mar 2005 02:03:07 GMT 42233 ↓ 1.eml Tue, 01 Mar 2005 02:03:34 GMT 200 ↓ 2.eml Tue, 01 Mar 2005 02:03:34 GMT 300 ↓ 2.eir Tue, 01 Mar 2005 02:03:34 GMT 1683 ↓ 6.evt Tue, 01 Mar 2005 02:03:36 GMT 17956 ↓ 4.eir Tue, 01 Mar 2005 02:03:47 GMT 6849 ↓ MLCmain.sc Tue, 01 Mar 2005 02:03:52 GMT 8515 ↓ 0.evt Tue, 01 Mar 2005 02:03:56 GMT 34413 ↓ 99.eml Tue, 01 Mar 2005 02:04:19 GMT 178 ↓ buttons.xml Tue, 01 Mar 2005 02:04:19 GMT 17214 ↓ MLC.cfg Wed, 16 Mar 2005 21:34:45 GMT 7188 ↓ 6568448 Bytes Left ↓ ↓ </pre>
<p>When working with the MLC's embedded Web pages, the response visible in HTML source code follows this structure:</p> <pre> var file=new Array(); file[1]="[filename 1],[day, date time1] GMT,[file size 1]"; ↓ file[2]="[filename 2],[day, date time2] GMT,[file size 2]"; ↓ file[3]="[filename 3],[day, date time3] GMT,[file size 3]"; ↓ ... file[n]="[filename n],[day, date time] GMT,[file size n]"; ↓ file[n+1]="[space remaining (to 7-digits)] Bytes Left; ↓ </pre>				
<p>Example (via Telnet or Hyperterminal):</p> <pre> [Esc] DF ← WDF| </pre>				

Command/response table for SIS commands (continued)

Command	ASCII (Telnet) (host to switcher)	URL Encoded (Web) (host to switcher)	Response (switcher to host)	Additional description
List files from the current directory and its subdirectories	<code>[Esc] LF</code>	WLF	(See responses to <code>[Esc] DF</code> , above.	The response is the same except that the path/directory precedes filenames for files within the subdirectories.
File streaming commands NOTE <i>File streaming commands should be used by advanced programmers only.</i>				
Load a file to user flash memory via Telnet or RS-232 ²⁸	<code>[Esc] + UF filename</code>	<code>{raw, unprocessed data in a file of up to filesize}</code>		
Retrieve a file from user flash memory via Telnet or RS-232 ²⁸	<code>[Esc] filename SF</code>	Up		{4 bytes of filesize, and then raw data from the file}
Load a file to user flash memory via port 80 (HTTP, Web browser)		Send a Post command on port 80 followed by the delimited data to be written to the file in flash memory.		
Retrieve a file from user flash memory via port 80 (HTTP, Web browser)		Send a Page Get command on port 80 followed by WSF		{The response is raw data from the file.}
Example:	<code>http://192.168.254.254/mypage.html?cmd=WSF</code>	<code>{data from the file mypage.html.}</code>		
Web browser-specific commands Read response from last URL command <code>[Esc] UB</code>				
E-mail Configure e-mail events (mailbox) ²⁴ <code>[Esc] [X45] [X46] [X47] CR</code>				
		W <code>[X45] %2C [X46] %2C [X47] CR</code>	Ipr <code>[X45] [X46] [X47]</code>	<p><code>[X45]</code> = e-mail event number (1 - 64).</p> <p><code>[X46]</code> = e-mail recipient's address (e.g., <code>JDoe@extron.com</code>) for the person to whom messages will be sent.</p> <p><code>[X47]</code> = name of e-mail file to be sent (first line of the file = the subject, the rest = the body of the e-mail).</p>
Example:	<code>[Esc] 5, jdoe@extron.com, 7.eml CR</code>	W <code>5%2Cjdoe%40extron%2Ecom%2C7%2Eeml CR</code>	Ipr 5, jdoe@extron.com, 7.eml	For e-mail event 5, send file 7.eml to jdoe@extron.com.
Read/view e-mail events	<code>[Esc] [X45] CR</code>	W <code>[X45] CR</code>	<code>[X46] [X47]</code>	

Command/response table for SIS commands (continued)

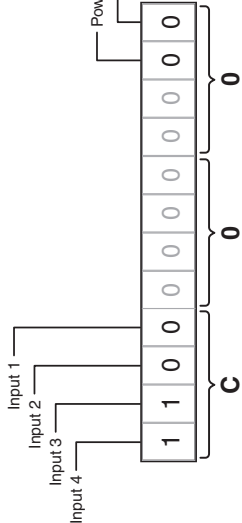
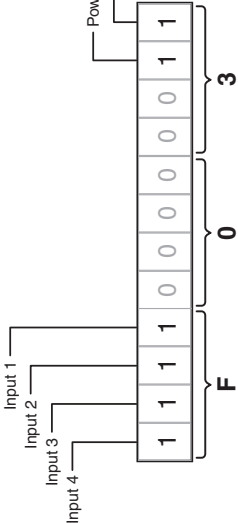
Command	ASCII (Telnet) (host to switcher)	URL Encoded (Web) (host to switcher)	Response (switcher to host)	Additional description
Send e-mail file named in mailbox ²⁴	[Esc] [X45] [SM] ←	W [X45] [SM]	Eml [X45] ↵	
Send a different e-mail file (one not named in the mailbox) ²⁴	[Esc] [X45] [X70] [X47] [SM] ←	W [X45] %2C [X70] %2C [X47] [SM]	Eml [X45] ↵	[X70] = The number to insert into an email message if a _____. <i>eml</i> file has an embedded server-side include "<!--echo var = "WCR | " -->" (the [Esc] ← command with no parameters.) The numeral is a 16-bit number to be employed as the user defines. This is an optional parameter. Use 0 as a placeholder if the optional [X47] variable is used but [X70] is not needed.
Set e-mail server IP address and user domain name ²⁴	[Esc] [X14] [X15] [CM] ←	W [X14] %2C [X15] [CM]	Ipm • [X14] , [X15] ↵	[X14] = IP address (xxx.xxx.xxx.xxx). Leading zeros are optional in setting values. [X15] = E-mail domain name, e.g., <i>extron.com</i>
Read/view e-mail server IP address and user domain name	[Esc] [CM] ←	W [CM]	[X14] , [X15] ↵	[X14] = IP address (xxx.xxx.xxx.xxx). Leading zeros are suppressed in returned values. [X15] = E-mail domain name, e.g., <i>extron.com</i>
Event control				
Start events ²⁷	[Esc] [1AE] ←	W [1AE]	Ego ↵	
Stop events ²⁷	[Esc] [0AE] ←	W [0AE]	Est ↵	
Query quantity of events running	[Esc] [AE] ←	W [AE]	#### ↵	The response is the quantity of currently running events, and it includes leading zeros. For example, if two events are running, the response is 00002 ↵ .
Set the event number ([X35]) to hook to front panel button presses (hardware-script interactions) ²⁴	[Esc] [X35] [EN] ←	W [X35] [EN]	Ehk [X35] ↵	If desired, use this command to designate an event script ([X35] . <i>EVT</i>) to be used to track and react to hardware happenings and MLC button presses. [X35] = event number (0 - 99). The default value of [X35] after a system reset is 255.

NOTE This command is optional. You do not have to use this command to set up the MLC. By default during configuration, the configuration software associates the main event script file (0.EVT) with hardware events and button presses. Once that event file has been compiled, it is capable of receiving information from the MLC's register that tracks hardware actions and button presses. In response to a detected button press or other hardware happening, the event script can then tell the MLC to issue commands, or make some other change. You would use this command only to associate a different event script file with tracking and responding to hardware/button actions.

Command/response table for SIS commands (continued)

Command	ASCII (Telnet) (host to switcher)	URL Encoded (Web) (host to switcher)	Response (switcher to host)	Additional description
Read the number of the event that's hooked to hardware /front panel changes	Esc EN ←	W EN	X35 ↓	Read the event number /event script (X35).
Select firmware or script control of buttons	Esc X211 ↓ Z ←	W X211 ↓ Z	Bse X211 ↓	This command determines whether the firmware or a script (software-generated instructions) controls the functions and lighting of a given button. X211 = Status of which buttons are controlled by script(s) and which are controlled by firmware. This variable is an 8-digit hexadecimal number. Refer to the diagram to see how this number is calculated.
<div><div><div>Binary bit map for script control of button enabling</div><div><div><div>Input 1</div><div>Input 2</div><div>Input 3</div><div>Input 4</div></div><div><div>Hex Nibble</div><div>Hex Nibble</div><div>Hex Nibble</div><div>Hex Nibble</div></div><div><div>Control bits (%)</div><div>0 = firmware control</div><div>1 = script control</div></div><div><div>Power Off</div><div>Power On</div></div></div></div><div><div>Convert binary to hexa-decimal.</div><div>00000#0#</div><div>Insert number into command.</div><div>Esc 00000#0# LZ ←</div><div>Add 5 leading zeros to the hex characters for a total of 8 characters.</div></div></div>				
<div><div><div>Example:</div><div>Change the Power On and Power Off buttons' functions from firmware control to script control.</div></div><div><div><div>Input 1</div><div>Input 2</div><div>Input 3</div><div>Input 4</div></div><div><div>0</div><div>0</div><div>0</div><div>0</div><div>0</div><div>0</div><div>0</div><div>0</div><div>0</div><div>0</div><div>1</div><div>1</div></div><div><div>0</div><div>0</div><div>0</div><div>0</div><div>0</div><div>0</div><div>0</div><div>0</div><div>0</div><div>0</div><div>0</div><div>1</div></div><div><div>3</div></div><div><div>Power Off</div><div>Power On</div></div></div></div> <div><div>Convert binary to hexa-decimal.</div><div>00000003</div><div>Insert number into command.</div><div>Esc 00000003 LZ ←</div><div>Add 5 leading zeros for a total of 8 characters.</div></div>				

Command/response table for SIS commands (continued)

Command	ASCII (Telnet) (host to switcher)	URL Encoded (Web) (host to switcher)	Response (switcher to host)	Additional description
<p>Example: Change the input 3 - 4 buttons from firmware control to script control.</p>			<p>Convert binary to hexa-decimal. Add 5 leading zeros for a total of 8 characters.</p> <p>00000C00</p> <p>Insert number into command.</p> <p>Esc 00000C00 LZ</p>	
<p>Example: Change all front panel buttons from firmware control to script control.</p>			<p>Convert binary to hexa-decimal. Add 5 leading zeros for a total of 8 characters.</p> <p>00000F03</p> <p>Insert number into command.</p> <p>Esc 00000F03 LZ</p>	
Read firmware/script button control status	Esc LZ	WLZ	X211	

Command/response table for SIS commands (continued)

Command	ASCII (Telnet) (host to switcher)	URL Encoded (Web) (host to switcher)	Response (switcher to host)	Additional description
Button LED control	Esc X212 LC ←	W X212 LC	Lse X212 ↓	This command specifies which front panel buttons (Power On, Power Off, Function/Room, and/or input selection buttons) light and in what colors. You can change the lighting of one, several, or all buttons at once. X212 = an 8-digit hexadecimal number representing the status of button lamp LEDs.
<div><div><p>Binary bit map for button LED status</p></div><div><p>Example</p><p>Light buttons:</p><ul style="list-style-type: none">• Power On = amber• Power Off = red• Inputs 1, 2 = amber• Input 3 = green• Input 4 = red</div><div></div></div>				

Command/response table for SIS commands (continued)

Command	ASCII (Telnet) (host to switcher)	URL Encoded (Web) (host to switcher)	Response (switcher to host)	Additional description
Read button LED status	Esc LC ←	W LC|	X212 ↓	
Set button LEDs to blink slowly ²⁴	Esc 1* X212 LX ←	W 1%2A X212 LX|	Lbk*1* X212 ↓	
Read which button LEDs are set to blink (whether slowly or fast)	Esc 1LX ←	W 1LX|	X212 ↓	
Set button LEDs to blink fast ²⁴	Esc 2* X212 LX ←	W 2%2A X212 LX|	Lbk*2* X212 ↓	
Read which button LEDs are set to blink fast	Esc 2LX ←	W 2LX|	X212 ↓	
NOTE The command to make a button LED blink fast takes precedence over the command to make it blink slowly. If a button's LEDs are set to blink both fast and slowly, the LED will blink fast.				
Reset (zap) commands and erase commands				
Erase the flash memory ²⁴	Esc ZFFF ←	WZFFF|	Zpf ↓	
Reset all device settings to factory defaults ²⁴	Esc ZXXX ←	WZXXX|	Zpx ↓	The "reset all settings" command does <u>not</u> affect IP settings or flash memory. It also does <u>not</u> affect user files stored in flash memory.
NOTE The ZXXX command does not reset any IP-related settings such as the IP address, subnet mask, and gateway IP address.				
Absolute system reset ²⁴	Esc ZQQQ ←	WZQQQ|	Zpq ↓	Reset <u>all</u> settings/memories. The ZQQQ command resets everything (all settings, adjustments, PINs, the IP address, and subnet mask) to the factory default values. Files in flash memory are also erased by this command. The firmware version doesn't change. The IP address is reset to 192.168.254.254, the subnet mask is reset to 255.255.0.0. This command is identical to reset mode 5, discussed in "Resetting the unit" in chapter 2.

The syntax for setting a special function for an MLC is $\boxed{x?} * _ \#$ where $\boxed{x?}$ is the value and $_$ is the function number. To view a function's setting, use $_ \#$, where $_$ is the function number. In the following table the values of the $\boxed{x?}$ variable are different for each command/function. These values are given in the rightmost column.

Command/response table for special function SIS commands (accessible via RS-232 only)

Command	ASCII Command (host to MLC)	Response (MLC to host)	$\boxed{x?}$ values and additional descriptions
Delay times Most projectors require a certain amount of time during warm-up and cool-down during which they do not accept commands. Once you have set the input selection lock during power on/off command (53#, page 5-35), send this command (1#) to specify the amount of time for the MLC to wait between sending the projector a power-on or power-off command and when the next input button press can occur.			
Power on delay ²⁴	$\boxed{x?} * 1 \#$	WarmUp* $\boxed{x?}$ ↵	0 = 0 seconds, 1 = 2 seconds, 2 = 4 seconds, ... in 2 second steps up to 150 = 300 seconds (5 minutes).
Example:	8*1#	WarmUp*008 ↵	Example: set a 16 second power on delay.
Example:	1#	WarmUp*023 ↵	Example: view the power on delay setting.
Power off delay ²⁴	$\boxed{x?} * 2 \#$	CoolDown* $\boxed{x?}$ ↵	0 = 0 seconds, 1 = 2 seconds, 2 = 4 seconds,... in 2 second steps up to 150 = 300 seconds.
Example:	23*2#	CoolDown*023 ↵	Example: set a 46 second power off delay.
Power off button delay ²⁴	$\boxed{x?} * 22 \#$	PwrOffDly* $\boxed{x?}$ ↵	0 = the power off button requires no hold delay (default), 1 = the power off button requires a 2-second hold delay before starting the power-off sequence.
Audio settings Limit audio level on display power-on ²⁴ $\boxed{x?} * 11 \#$			
		VolLimit* $\boxed{x?}$ ↵	If this feature is enabled, the maximum initial power-up volume level does not exceed the level specified by this command. 0 = audio off, ..., 20 = default value, ..., 100 = no limit on audio level at power-on.
NOTE	The MLC responds with an E14 error code when volume mode = 1 (increment/decrement).		
NOTE	The maximum $\boxed{x?}$ is limited by the maximum volume setting (47#). You must set the maximum volume (47# command) before setting the limit audio level feature (11# command). See page 5-34.		
Example:	28*11#	VolLimit*028 ↵	Example: limit power-up volume to 70% of maximum volume.

SIS™ Programming and Control, cont'd

Command/response table for special function SIS commands, continued

Command	ASCII Command (host to MLC)	Response (MLC to host)	[X?] values and additional descriptions
Miscellaneous settings			
Enable switcher slaving	[X?] *41 #	Slave*[X?] ↵	For [X?], 0 = disable control of a slaved Extron MLS switcher, 1 = enable (default) MLS slaved switcher control
Volume knob mode ²⁴	[X?] *46 #	VolMode*[X?] ↵	For [X?], 0 = discrete volume values 1 = continuous increment/ decrement.
Max. volume ²⁴	[X?] *47 #	VolMax*[X?] ↵	For maximum volume, [X?] is 1 to 100. 40 = stand-alone MLC default, 100 = default for an MLC with a slaved, detected MLS switcher.
<p>NOTE Maximum volume cannot be changed while an MLS switcher is detected at the MLC's MLS slave switcher port.</p> <p>NOTE When the maximum volume is changed, the volume level and the volume limit during display power-up (11#) are set to 25% of the new maximum volume setting.</p>			

Command/response table for special function SIS commands, continued

Command	ASCII Command (host to MLC)	Response (MLC to host)	X? values and additional descriptions
Button press/release emulation Emulating a button press or release causes the commands and actions that are associated with the button via the main event script to be executed. Button emulation triggers only what has been set up via the <i>Button Config.</i> part of the Windows-based configuration program or via Global Configurator 2.0 or higher. Emulation does <u>not</u> trigger the built-in SIS input switching commands (X200 !) or the projector power on/off commands (1P or 0P). See the diagrams below and on the next page to determine the number of the memory block associated with each button.			
NOTE The input button register numbering shown in the following illustrations is for a stand-alone MLC.			
Button/Switch Memory Block Numbering for the MLC 104 Series, SCP 104 Series, and IR 402			
Emulate a button/switch press	X? *42 #	SwPrs*X? ↵	This command causes the MLC to issue the commands associated with a button press. X? = the number of the memory block for the button/switch for which you want to emulate a press (1 - 128).
Emulate a button/switch release	X? *43 #	SwRls*X? ↵	This makes the MLC issue the commands associated with a button release. X? = the button's/switch's memory block number.
Emulate a button press-and-release	X? *44 #	SwCmd*X? ↵	The MLC issues the commands associated with both the press and the release of the specified button. X? = the button's/switch's memory block number.

SIS™ Programming and Control, cont'd

Command/response table for special function SIS commands, continued

Command	ASCII Command (host to MLC)	Response (MLC to host)	X? values and additional descriptions
Button control			
Set slave map ²⁴	X? * 3Y? # X? values Default: X? = Y? 00 = input 0 01 = input 1 02 = input 2 ... 98 = input 98 99 = input 99	SlaveMapY? * X? ↵ Y? values 1 = input button 1 2 = input button 2 3 = input button 3 4 = input button 4	X? is the actual input channel (including inputs on a slaved switcher) to select when button Y? is pressed. The values for these variables are shown at left.
Example:	6*34#	SlaveMap4*6↵	Map input 6 (an input on a slaved switcher) to the MLC's input button 4. When button 4 is pressed, the A/V system switches to input 6, and any instructions (DVD or VCR control commands, for example) associated with input button 4 on the MLC are executed.
Set and trigger a button press repeat	X? * Y? *45 #	RptRate*X? * Y? ↵	This command tells the MLC to repeat a specific button's commands at a fixed interval (a set frequency). X? = the number of the button/switch (1 - 128). See the diagram on page 5-34. Y? is the repeat interval: 0 to 65535, in 20 ms steps. 1 = 20 ms, 2 = 40 ms, 3 = 60 ms,... 65535 = 1,310,700 ms = 21.845 minutes. If Y? = 0, the MLC stops repeating the selected button's commands.
Example:	9*850*45#	RptRate*9*850↵	The commands associated with the input 1 button are executed every 850x20 ms (= 17,000 ms = 17 seconds) until the repeat rate for that button is set to 0 ("cleared").
NOTE	The button repeat SIS command (X? * Y? *45 #) must be entered each time you want to have a button press trigger repeated command releases. Also, only one button at a time can be set to repeat: multiple buttons can not be in repeat mode simultaneously.		
NOTE	The Repeat while held every... feature found in the configuration software (in the Button Config. tab) and Global Configurator 2 is based on this command. However, through scripting the MLC sets the repeat mode on in response to a specific button press, and it sets the repeat mode to 0 when the button is released or input is no longer selected.		
Query button repeat rate status	45#	X? * Y? ↵	See the variables for the command shown above.
Clear (turn off) the button repeat ²⁴	0*0*45#	RptRate*000*00000↵	This command clears the button repeat setting and turns off the button repeat function.

Command/response table for special function SIS commands, continued

Command	ASCII Command (host to MLC)	Response (MLC to host)	X? and Y? values and additional descriptions
Front panel button LED control ²⁴	X? * Y? *51 # X? values 0 = all LEDs are off 1 = green LED is on 2 = red LED is on 3 = green & red LEDs are on (button glows amber) 4 = slowly blinking green 5 = slowly blinking red 6 = slowly blinking amber 7 = fast blinking green 8 = fast blinking red 9 = fast blinking amber	Lmp Y? * X? ↵ Y? values 1 = power on button 2 = power off button 9 = input button 1 10 = input button 2 11 = input button 3 12 = input button 4	X? is the LED state, Y? is which projector power, input, or room/function button to control. See the list of values at left.
Query button LED control status	Y? * 51 #	X? ↵	See the variables for the command shown above.
Front panel lockout			
Lock out input selection during power-on/power off ²⁴	X? * 53 #	PwrLock * X? ↵	For X?: 0 = off (default) 1 = on
NOTE This command applies to input selection buttons in the switching rotation only (input buttons that are not controlled by scripts).			
Input switching lockout duration ²⁴	X? * 54 #	IODelay * X? ↵	This command locks out (prevents changes to) input switching for the specified duration after an input has been switched. X? is the lockout duration of from 0 to 65535, in 20 ms steps. 1 = 20 ms, 2 = 40 ms, 3 = 60 ms,... 65535 = 1,310,700 ms = 21.845 minutes. Default = 25 = 0.5 s.
NOTE This command applies to input selection buttons in the switching rotation only (input buttons that are not controlled by scripts).			
Example:	25*54#	IODelay*25 ↵	Inputs cannot be switched for 0.5 seconds after an input change.
Enable PIN ²⁴	X? * 60 #	PINEnable * X? ↵	For X?, 0 = personal identification number (PIN) access is enabled for all levels (administrator and user) 1 = administrator PIN only is enabled 2 = PIN access is disabled (default)
NOTE PIN access can be used only while display power is off.			
Set PIN ²⁴	X? * Y? * 61 #	PINNum * X? * Y? ↵	For X?, 0 = administrator level, 1 = user level. For Y?, the PIN is any 4-digit combination of the numbers 1 through 4. Administrator default PIN = 1423. User default PIN = 0

SIS™ Programming and Control, cont'd

Command/response table for special function SIS commands, continued

Command	ASCII Command (host to MLC)	Response (MLC to host)	X? and Y? values and additional descriptions
Query PIN ²⁴	X? * 61 #	Y? ↵	For X?, 0 = administrator level, 1 = user level. Y? is the corresponding 4-digit PIN.