CL8800 RS232 Serial Interface

Protocol: MICL-CL8800
For firmware version 1.05 and greater
Revision 1.0
Initial issue date: December 09, 2015
Initial version 1.0 issue date: December 09, 2015
Latest revision date: December 09, 2015
Created by: Joel Styer
Maintained by: Joel Styer

The CL8800 includes an RS232 serial interface for remote control and query of the unit. This document describes the operation and interface of that port. The RS232 Port is provided standard on all CL8800 units. The CL8800 is NOT compatible with the command set of the CL5400 and CL3400 since it utilizes a greatly expanded operation set.

Physical Interface

The connections are made via a 9 pin female D-sub connector on the rear of the unit.

The cable used for a standard PC will be a "straight through" 9 pin to 9 pin, male-female wired cable (pin 2 to pin 2, pin 3 to pin 3 and pin 5 to pin 5). MicroImage Video Systems can provide standard cables to match 9 or 25 pin serial ports.

The specifications are:

Physical Interface: RS232D/EIA232D
Baud rate: 9600
Data bits: 8
Parity: None
Stop bits: 1
Handshaking: None
Physical Connection: 9 pin D-sub female
Protocol Type: MicroImage Control Format Version 4
Sub-protocol   MICL-CL8800-105

Pinout:

      1 - No Connection
      2 - TXD (data transmitted from the CL8800)
      3 - RXD (data received into the CL8800)
      4 - No Connection
      5 - Ground
      6 - No Connection
      7 - No Connection
      8 - No Connection
      9 - No Connection

Data Transmission

The CL8800 can receive a constant data stream. Data is pipelined in such a way within the unit that the result may not be visible for up to 70 milliseconds after the last data byte in a command sequence has been received. Normally, this is not a problem since it still appears to happen immediately to the user. Response to queries may not start until up to 70mS after the request has finished. It is recommended that a second query command not be started until the first one has delivered its information,

Command Structure

The command structure is composed of simple ASCII characters and is fairly easy to implement. It can also be tested with a standard ASCII terminal or emulation program. The command sequence consists of a Command, an assignment character (=, ASCII 32 decimal, 20 hex) and the value to be written, terminated by a Carriage Return (CR, decimal 13, hex 0d). Data is not processed internally until the CR is received.

        Command structure: # # # # = # # # # CR
                                           COMMAND CODE# = DATA# CR

The basic structure for queries is just a slight bit different with addition of a question mark:

        Query structure: ? # # # # CR
                                           ? COMMAND CODE# CR

The Escape character (ESC, decimal 27, hex 1b) will abort a command in process. Entering an ESC character in the middle of any command sequence will reset it to the beginning and start a new command sequence.

The Command # is the index to system registers as defined in the document below. It must be at the beginning of the command sequence (unless prefixed by a unit address which is presently not implemented). Commands have varying length from 1 to 8 digits.

The data can consist of a value 0 to 4294967295 (0 to FFFFFFFF hex)(32 bit data, unsigned) and have a different length or range for each command.

The stop character consists of a Carriage Return (decimal 13, hex 0d).

The unit defaults to decimal mode, where all numeric values are entered in decimal values. The unit can optionally be placed into hexadecimal (HEX) mode where all numeric values will be entered in hex. The change to hex will have to be done on each power up or reset cycle as this is not stored in non-volatile memory.

Queries. The CL8800 can be queried for information as to the state of its operation. Most settings that can be changed with a command can also be queried to find out the current state of that command. After a query is started, the CL8800 will return the data followed by a Carriage Return (CR - decimal 13, hex 0d) and Line Feed (LF – decimal 10 , hex 0A), together known as a CTLF.

Commands

0   No Operation

        Entering a command of 0 (zero) or hitting enter without any command will result in no operation being performed.

1   Hexadecimal / Decimal Mode

        Allows numeric values to be entered & displayed as hexadecimal or decimal. Entering a value of 0 will select hex mode, a value of 1 will select decimal mode. The default is decimal mode (1). This value is NOT stored in non-volatile memory and will need to be changed on each power up cycle if hexadecimal mode is required.

        Examples: 1=0 CR   will set the unit operation to HEX Mode.
                       1=1 CR   will set the unit operation to DECIMAL Mode (default).
        Query   ?1 CR   will return the currently set Hex/Decimal Mode followed by CRLF

3   Query Unit / Version

This is a read only (query) command that allows you to read a string value that holds the model number, hardware version, software version and last revision date. The value can be set or changed for this command.

Query   ?3 CR   will return a string consisting of the versions & date followed by CRLF

Example return string (yours may be different):   #mPCB15106,v0105,d20151208. CRLF

The string with always start with the # symbol and end with a period (before CRLF)

Other fields may also be present as needs dictate.

Explanation of fields (additional fields may be present as needed):

        m = Model Number field.
        v = firmware code version
        d = date of code base

8   Acknowledge Level

Not implemented, reset to 0 if changed.

9   Debug Mode

Set to 0 (zero) for normal operation. Set to 2 to see additional information when using a terminal.

20   Unit Visibility

This will turn all of the currently enabled overlays off or on and is the same as using the DISPLAY switch on the front of the unit. This value is held in non-volatile memory and will be retained after power is removed or the unit is turned off.

Examples: 20=0 CR   will turn the on screen overlay off.
               20=1 CR   will turn the on screen overlay on.
Query   ?20 CR   will return the value of visibility (0 or 1) followed by CRLF

LINE POSITIONS (1000 – 1007)

1000   Line 0 Position (vertical line) (hex 3E8)

The value applied to this command will set the position of line 0 in pixels from the left edge of the raster. Note that zero may be off screen on some monitors. The range is 0 to 1919 for a 1080p signal and 0 to 1279 for a 720p signal. This value is stored in non-volatile memory and will be retained after power is cycled.

Example: 1000=580 CR   will set line 0 to 580 pixels from the left edge of the screen.
Query   ?1000 CR   will return the position of line 0 followed by CRLF

1001   Line 1 Position (horizontal line) (hex 3E9)

The value applied to this command will set the position of line 1 in pixels from the top of the raster. Note that zero may be off screen on some monitors. The range is 0 to 1079 for a 1080p signal and 0 to 719 for a 720p signal. This value is stored in non-volatile memory and will be retained after power is cycled.

Example: 1001=640 CR   will set line 1 to 640 pixels from the top edge of the screen.
Query   ?1001 CR   will return the position of line 1 followed by CRLF

1002   Line 2 Position (vertical line) (hex 3EA)   - See line 0 Position above for more information.
1003   Line 3 Position (horizontal line) (hex 3EB)   - See line 1 Position above for more information.

1004   Line 4 Position (vertical line) (hex 3EC)   - See line 0 Position above for more information.
1005   Line 5 Position (horizontal line) (hex 3ED)   - See line 1 Position above for more information.
1006   Line 6 Position (vertical line) (hex 3EE)   - See line 0 Position above for more information.
1007   Line 7 Position (horizontal line) (hex 3EF)   - See line 1 Position above for more information.

LINE COLORS (1100 – 1107)

1100   Line 0 Color (hex 44C)

The value applied to this command will set the color of line 0. The colors are selected from the current palette used in the this product which includes over 200 colors. The range is 0 to 255 (Hex 0 to FF). This value is stored in non-volatile memory and will be retained after power is cycled.

Examples: 1100=15 CR   will set line 0 to bright white.
                 1100=0 CR   will set line 0 to black.
Query   ?1100 CR   will return the color of line 0 followed by CRLF

1101   Line 1 Color (hex 44D)   - See Line 0 Color above for more information.
1102   Line 2 Color (hex 44E)   - See Line 0 Color above for more information.
1103   Line 3 Color (hex 44F)   - See Line 0 Color above for more information.
1104   Line 4 Color (hex 450)   - See Line 0 Color above for more information.
1105   Line 5 Color (hex 451)   - See Line 0 Color above for more information.
1106   Line 6 Color (hex 452)   - See Line 0 Color above for more information.
1107   Line 7 Color (hex 453)   - See Line 0 Color above for more information.

LINE STYLE (1200 – 1207)

1200   Line 0 Style (hex 4B0)

The value applied to this command will set the style of line 0. The style includes settings such as if the line is solid or serrated, the serration spacing and serration gap ratio. Individual lines may also be turned off with this setting. The range is 0 to 255 (Hex 0 to FF). This value is stored in non-volatile memory and will be retained after power is cycled.

Examples: 1200=0 CR   will set line 0 to off (non-visible).
                 1200=1 CR   will set line 0 to a solid line.
                 1200=15 CR   will set line 0 to an even spaced serrated line (- - - -)
Query   ?1200 CR   will return the style of line 0 followed by CRLF

1201   Line 1 Style (hex 4B1)   - See Line 0 Style above for more information
1202   Line 1 Style (hex 4B2)   - See Line 0 Style above for more information
1203   Line 1 Style (hex 4B3)   - See Line 0 Style above for more information
1204   Line 1 Style (hex 4B4)   - See Line 0 Style above for more information
1205   Line 1 Style (hex 4B5)   - See Line 0 Style above for more information
1206   Line 1 Style (hex 4B6)   - See Line 0 Style above for more information
1207   Line 1 Style (hex 4B7)   - See Line 0 Style above for more information

LINE WIDTH (1400 – 1407)

1400   Line 0 Width (hex 578)

The value applied to this command will set the width of line 0 in pixels. The range is 1 to 3 (Hex 1 to 3). This value is stored in non-volatile memory and will be retained after power is cycled. Note: Entering a line width of 0 will still display a 1 pixel wide line.

Examples: 1400=1 CR   will set line 0 to 1 pixel wide.
                 1400=2 CR   will set line 0 to 2 pixels wide.

| | | 1400=3 CR | will set line 0 to 3 pixels wide. |
| | Query | ?1400 CR | will return the width of line 0 followed by CRLF |

1401 **Line 1 Width (hex 579)** - See Line 0 Width above for more information
1402 **Line 2 Width (hex 57A)** - See Line 0 Width above for more information
1403 **Line 3 Width (hex 57B)** - See Line 0 Width above for more information
1404 **Line 4 Width (hex 57C)** - See Line 0 Width above for more information
1405 **Line 5 Width (hex 57D)** - See Line 0 Width above for more information
1406 **Line 6 Width (hex 57E)** - See Line 0 Width above for more information
1407 **Line 7 Width (hex 57F)** - See Line 0 Width above for more information

CONTROL LOCKS (1500 – 1507)

1500 **Control 0 Lock (hex 5DC)**

The value applied to this command will set a rotary line control to be locked or unlocked. When locked, moving the control has no effect on line movement. Note that this function locks a specific movement control, not a specific line. The range is 0 to 1 (Hex 0 to 1), 1 means the control is locked. This value is stored in non-volatile memory and will be retained after power is cycled. Note: lock commands 0 to 3 are for the controls when the bank switch is not active (Bank LED off), lock commands 4 through 7 affect the controls when the bank switch is active (Bank LED on).

		1500=0 CR	will unlock control 0.
Examples:		1500=1 CR	will lock control 0.
	Query	?1500 CR	will return the lock state of control 0 followed by CRLF

1501 **Control 1 Lock (hex 5DD)** - See Control 0 Lock above for more information
1502 **Control 1 Lock (hex 5DE)** - See Control 0 Lock above for more information
1503 **Control 1 Lock (hex 5DF)** - See Control 0 Lock above for more information
1504 **Control 1 Lock (hex 5E0)** - See Control 0 Lock above for more information
1505 **Control 1 Lock (hex 5E1)** - See Control 0 Lock above for more information
1506 **Control 1 Lock (hex 5E2)** - See Control 0 Lock above for more information
1507 **Control 1 Lock (hex 5E3)** - See Control 0 Lock above for more information

LINE PROPERTIES (1900 – 1907)

1900 **Origin (hex 76C)**

The value applied to this command will set the origin in the upper left (value of 0) or the lower left (value of 1). This will affect the vertical direction that the controls move when connected to horizontal lines. This setting only applies to the horizontal lines. If the origin is set to upper left, turning the control clockwise will move the line down the screen. If set to 1, turning the control clockwise will result in the line moving up the screen. This value is stored in non-volatile memory and will be retained after power is cycled.

		1900=0 CR	will set the origin to upper left.
Examples:		1900=1 CR	will set the origin to lower left..
	Query	?1900 CR	will return the origin followed by CRLF

1901 **Box Fill Color (hex 76D)**

The value applied to this command will set the fill (inside) color of the box (if enabled). The colors are selected from the current palette used in the this product which includes over 200 colors. The range is 0 to 255 (Hex 0 to FF). This value is stored in non-volatile memory and will be retained after power is cycled.

		1901=15 CR	will set the fill color to bright white.
Examples:		1901=0 CR	will set the fill color to black.
	Query	?1901 CR	will return the box fill color value followed by CRLF

1902   Movement Mode (hex 76E)

The value applied to this command will set the movement mode of the lines. When this command is set to 0 (independent mode), all lines will operate independently of each other when the controls are moved. When set to 1 (tracking mode), one control will move a pair of lines while another control will move only one of those lines to set the spacing. When set to 2 (mirror mode), one control will move both lines (maintaining the spacing) while the second control will move both lines in opposite directions, increasing or decreasing the spacing. The valid range is 0 to 2 (Hex 0 to 2). This value is stored in non-volatile memory and will be retained after power is cycled.

Examples: 1902=0 CR   will set the unit to the Independent movement mode.
                      1902=1 CR   will set the unit to the Tracking movement mode.
                      1902=2 CR   will set the unit to the Mirror movement mode.
Query   ?1902 CR   will return the current movement mode followed by CRLF

1903   Line / Box Control 0 (hex 76F)

The value applied to this command will set the first group (0-3) of lines to operate as either full screen lines or as a box (truncated lines). This value is stored in non-volatile memory and will be retained after power is cycled. The valid range is 0 to 3 (Hex 0 to 3). Below are the four possible combinations for this command:

Examples: 1903=0 CR   will set line group 0 to full line mode (default).
                      1903=1 CR   will set line group 0 to hollow box mode.
                      1903=2 CR   will set line group 0 to box mode and fill entire screen with box fill color.
                      1903=3 CR   will set line group 0 to solid box mode and fill the box with the box fill color.
Query   ?1903 CR   will return the current group 0 line/box mode followed by CRLF

1904   Line / Box Control 1 (hex 770)

The value applied to this command will set the second group (4-7) of lines to operate as either full screen lines or as a box (truncated lines). This value is stored in non-volatile memory and will be retained after power is cycled. The valid range is 0 to 3 (Hex 0 to 3). Below are the four possible combinations for this command:

Examples: 1904=0 CR   will set line group 1 to full line mode (default).
                      1904=1 CR   will set line group 1 to hollow box mode.
                      1904=2 CR   will set line group 1 to box mode and fill entire screen with box fill color.
                      1904=3 CR   will set line group 0 to solid box mode and fill the box with the box fill color.
Query   ?1904 CR   will return the current group 1 line/box mode followed by CRLF

1905   CrossLine Operating Mode (hex 771)

The CL8800 has the ability to operate in several different modes which will affect how the controls interact with the lines. The modes are as follows:

Mode 0 (XXYY/XXYY)- Standard (default) mode. The left two controls operate vertical lines while the right two controls operate horizontal lines.
Mode 1 (XYXY/XYXY) – Legacy mode. The first and third controls operate vertical lines, while the second and fourth operate the horizontal lines.
Mode 2 (XXXX/YYYY) – All four controls operate vertical lines, when the bank switch is activated, all four controls operate the horizontal lines.
Mode 3 (YYYY/XXXX) – All four controls operate horizontal lines, when the bank switch is activated, all four controls operate the vertical lines.

While additional modes can be set, they are not currently supported on this hardware platform.

Examples: 1905=0 CR   will operating mode to 0 (XXYY/XXYY).
                      1905=1 CR   will operating mode to 1 (XYXY/XYXY).
                      1905=2 CR   will operating mode to 2 (XXXX/YYYY).

	1905=3 CR	will operating mode to 3 (YYYY/XXXX).
Query	?1905 CR	will return the current operating mode followed by CRLF

1906   Bank Select (hex 772)

This will select which bank is currently active for the controls. A value of 0 will select the main bank of lines (line 0 through line 3), while a value of 1 for this command will select the alternate bank of lines (line 4 through line 7).

Examples:	1906=0 CR	Selects bank 0.
	1906=1 CR	Selects bank 1.
Query	?1906 CR	will return the current bank selected followed by CRLF

Other Settings

Power can only be controlled through the front panel switch or by removing the power source. Due to the flexible design of the unit, power can be removed without first turning the unit off. It will remember the last state of the power switch and boot accordingly.

In the future, there will likely be additions to this command structure as we add new features to the CL8800. We will try to make it as backward compatible as possible.

Assistance

If you have any questions regarding this document or product, please call:

MicroImage Video Systems
div of World Video Sales Co., Inc.
PO Box 331
Boyertown, PA 19512
Phone 610-754-6800 x12
Fax 610-754-9766
Email techsupport@mivs.com
www.mivs.com