SCHOTT ColdVision Light Source

Programming Guide

D20980.026 Rev C – DCN 51219

October 2019

Table of Contents

Table of Contents

Introduction

This Programming Guide is to explain the use of advanced interfaces of the Schott ColdVision Light Source. This document will be updated as new features are added to the software.

Downloads

All data sheets, manuals, firmware updates, and example software can be downloaded from the SCHOTT website at the following link:

https://www.us.schott.com/lightingimaging/english/sensors/products/coldvision/cvls.html

Comments

We welcome your feature requests and comments about this document.

You can reach us by e-mail at lightingimaging@us.schott.com

Introduction

Remote Operation

The CV-LS has several remote operation interfaces. Any interface using the legacy protocol can be connected to using most terminal applications. Possible interfaces and their default connection information can be found below:

- ❖ Legacy Protocol
  - ➢ Ethernet Socket
    - ▪ Set terminal application to Telnet
    - ▪ Port 50811
    - ▪ Static IP Address 192.168.0.2
    - ▪ DHCP Enabled
  - ➢ UART
    - ▪ 9600 Baud
    - ▪ 8 Bit
    - ▪ 1 Stop Bit
    - ▪ No Parity
    - ▪ RX, TX, and GND must be connected through the Multiport
  - ➢ USB
    - ▪ CV-LS USB Driver must be installed
    - ▪ Terminal application will show the CV-LS as a RS232 port, but no additional settings are needed
- ❖ Binary Protocol
  - ➢ Ethernet Socket
    - ▪ Port 5000
    - ▪ Static IP Address 192.168.0.2
    - ▪ DHCP Enabled

Legacy Protocol

Legacy Protocol

Command Structure

All commands start with the ampersand character "&" and end with a carriage return "\r". There is a string representing the command immediately after the "&", followed by the desired value.

The unit will discard all characters until it receives an "&" start character. Once the carriage return "\r" is received, the unit will process the command. If a valid command is not found, the unit will return "&n" followed by the command string with an indicator of which character was not recognized.

Negative Acknowledgements

Negative acknowledgements are used to indicate that a received command was invalid. The following negative acknowledgements are supported.

INVALID
COMMAND:

Return string format: &nXpY
&n = Negative acknowledgement
X = Received characters parsed correctly
p = Invalid character location start
Y = Invalid character received

INVALID
PARAMETER:

Return string format: &nXpYYY
&n = Negative acknowledgement
X = Received characters parsed correctly
p = Invalid parameter location start
Y = Invalid parameter received

Legacy Protocol

Legacy Protocol

Legacy Protocol

Legacy Protocol

System Status

Command Details

1　System Status

1.1　Temperature

1.1.1　Board

&?BM　　Get current thermistor status of the main PCB
　　　　Return string: **&?bmX**
　　　　Return value (**X**): 1 = Good, 2 = Warning, 3 = Error

&?BS　　Get status of the temperature sensor on the main PCB
　　　　Return string: **&?bsX**
　　　　Return value (**X**): 1 = Fully Functional, 0 = Warning or Error

&?BT　　Get current temperature of the main PCB in Celsius
　　　　Return string: **&?btX**
　　　　Return value (**X**): 0.0 – 100.0

1.1.2　LED

1.1.2.1　Legacy

&CT?　　Get current temperature of the LED PCB in Celsius (Legacy Command, See &?lt).
　　　　Return string: **&ctX**
　　　　Return value (**X**): LED Temp in "XX" format.

　　　　Note: Unit will accept command without (?) for backwards compatibility.

1.1.2.2　CV-LS

&?LM　　Get current thermistor status of the LED PCB
　　　　Return string: **&?lmX**
　　　　Return value (**X**): 1 = Good, 2 = Warning, 3 = Error

&?LS　　Get status of the temperature sensor on the LED PCB
　　　　Return string: **&?lsX**
　　　　Return value (**X**): 1 = Fully Functional, 0 = Warning or Error

&?LT　　Get current temperature of the LED PCB in Celsius
　　　　Return string: **&?ltX**
　　　　Return value (**X**): 0.0 – 100.0

Legacy Protocol

System Status

1.2   Voltage Monitors

1.2.1   Input

1.2.1.1   Voltage

&?VI   Get the voltage of the input rail. This will be the higher voltage of the 2 inputs to the unit.
Input Voltage is rated for 18 - 28V.
Return string: **&?viX.XX**
Return value (**X.XX**): Floating Point Voltage with 2 decimal places

1.2.1.2   Status

&?VIS   Gets the status of the input rail. This will report a warning as the voltage nears its range, then turn to an error before the unit shuts down.
Warning = V > 28 or V < 19
Error = V > 30 or V < 18
System shutdown will occur near 17.5V and will not turn on again below 18V. Voltage above 33V will damage the LED driver circuit.
Return string: **&?visX**
Return value (**X**): 1 = Good, 2 = Warning, 3 = Error

1.2.2   Reference 5V Output

1.2.2.1   Voltage

&?VO   Get the actual voltage of the 5V reference pin on the multiport.
Output Reference Voltage is 5V +/- 0.1V.
Return string: **&?voX.XX**
Return value (**X.XX**): Floating Point Voltage with 2 decimal places

1.2.2.2   Status

&?VOS   Gets the status of the 5V reference rail. This will report a warning as the voltage is pulled out of regulation. This would generally be caused by overloading the output regulator.
Warning = >10%
Error = >25%
Return string: **&?vosX**
Return value (**X**): 1 = Good, 2 = Warning, 3 = Error

1.3   Fan

1.3.1   Speed

&?G   Gets the current fan speed in RPM
Return string: **&?gX**
Return value (**X**): 0 – 24000

Legacy Protocol

System Status

1.3.2 Status

&?GS   Gets the current fan status
Return string: **&?gsX**
Return value (**X**):
0 = Off
1 = Good
2 = Warning
3 = Error
4 = Info

1.4 Equalizer

1.4.1 Stability

&ES?   Gets the Equalizer Stability
Return string: **&esX**
Return value (**X**):
0 = non stable
1 = Locked (stable)
2 = Waiting for delay to start
4 = intensity low
6 = intensity high
8 = over range (intensity too low to maintain stability)
10 = under range (intensity too high to maintain stability)

1.4.2 Status

&ESD?   Gets the Equalizer Status
Return string: **&esdX**
Return value (**X**):
0 = Off
1 = Good
2 = Warning
3 = Error
4 = Info

1.5 System Information

1.5.1 System Mode

&?SM   Gets the current operating mode of the system
Return string: **&?smX**
Return value (**X**):

1.5.2 User Mode

&?SU   Gets the current user mode. This can be overridden with individual commands.
Return string: **&?suX**
Return value (**X**):

Legacy Protocol

System Status

1.5.3　Time

&?ST　　Gets the current system time in seconds from the epoch.
　　　　　Return string: **&?stX**
　　　　　Return value (**X**):

1.6　Light Feed Back Raw

&?I　　Gets the current raw value of the Light Feed Back sensor.
　　　　　Return string: **&?iX**
　　　　　Return value (**X**): 0 – 4096

1.7　Error Flags

&C?　　Reports any error flags for the system.
　　　　　Return string: **&cX**
　　　　　Return value (**X**): 8 bit value, Bit 0 = Fan Error, Bit 1 = LED Temp Error, Bit 8 = Any Faults.
　　　　　Bit values: 1 = Fault Exists, 0 = No Fault Exists.

　　　　　Note: Unit will accept command without (?) for backwards compatibility.

1.8　Inputs

1.8.1　Analog

&?A#　　Gets current value of an analog channel specified by #.
　　　　　Input Options (#): 0 = Front Knob, 1-4 = Multiport Analog Channel Input
　　　　　Return string: **&?a#X**
　　　　　Return value (**X**): 0 – 1000

1.8.2　Digital

&?D#　　Gets current value of a digital channel specified by #.
　　　　　Input Options (#): 0 = Front Switch, 1-4 = Multiport Digital Channel Input
　　　　　Return string: **&?d#X**
　　　　　Return value (**X**): 0 – 1000

Legacy Protocol

System Status

1.9   *Identification*

1.9.1   Product Name
&Q   Gets a string containing the product name.
                Return value: **&qSCHOTT ColdVision Light Source**

1.9.2   Firmware Revision
&F?   Gets the firmware revision of the unit.
                Return String: **&fX.XX**
                Return value (**X.XX**): Firmware Revision

                Note: Unit will accept command without (?) for backwards compatibility.

1.9.3   Serial Number
&Z?   Gets unit Serial Number.
                Return string: **&zXXXXXX**
                Return value (**XXXXXX**): 6 digit serial number

                Note: Unit will accept command without (?) for backwards compatibility.

1.9.4   Model
&ZM?   Gets unit Model
                Return string: **&zmY**
                Return value (**Y**): Model String

                Note: Unit will accept command without (?) for backwards compatibility.

1.9.5   Model:Serial
&ZF?   Gets unit Model:Serial number.
                Return string: **&zfY:XXXXXX**
                Return value (**Y**): Model String
                Return value (**XXXXXX**): 6 digit serial number

                Note: Unit will accept command without (?) for backwards compatibility.

Legacy Protocol

System Status

1.10 Memory Write Cycles

1.10.1 Factory Settings
&?MF

Get the number of times the Factory Settings have been stored to memory.
Rated for 1,600,000 write cycles.
Return string: **&?mfX**
Return value (**X**): Write Count

1.10.2 User Settings
&?MS

Get the number of times the User Settings have been stored to memory.
Rated for 40,000,000 write cycles.
Return string: **&?msX**
Return value (**X**): Write Count

1.10.3 SPI (Firmware Uploads)
&?MP

Get the number of times the user has written to the firmware flash memory.
Rated for 10,000 write cycles.
Return string: **&?mpX**
Return value (**X**): Write Count

1.10.4 Error Logs
&?ML

Get the number of times an Error Log has been stored to memory.
Rated for 25,600,000 write cycles.
Return string: **&?mlX**
Return value (**X**): Write Count

Legacy Protocol

Configurations

2 Configurations

2.1 Persistent Memory

2.1.1 Save Settings
&S Command forces the unit to store the current settings to non-volatile memory.
Return string: **&s**

2.1.2 Restore Settings
&T Command forces the unit to restore the current settings to those stored in non-volatile.
Return string: **&t**

2.2 Factory Defaults

2.2.1 Restore All Factory Defaults
&0 This command causes the unit to return to all settings stored at the factory.
Return string: **&o**

2.2.2 Restore Factory Defaults (Preserving Network Settings)
&02 This command causes the unit to return to all settings stored at the factory, but will keep the current network settings.
Return string: **&o2**

2.2.3 Erase Exception Logs
&03 This command causes the unit to erase any current exceptions from the log.
Return string: **&o3**

2.2.4 Reboot System
&04 This command causes the unit to reboot the processor. This has the same effect as power cycling the unit.
Return string: **&o4**

Legacy Protocol

Controls

3　Controls

3.1　Control Mode

3.1.1　Last Command Interface

&M#　　Gets which interface was the last to accept a command change to the system.
Input Options (**#**):0 = Front, 1 = Multiport, 2 = RS232, 3 = Legacy Socket,
4 = USB, 5 = Web Interface, 6 = Binary Socket, ? = Query
Return string: **&mX**
Return value (**X**): 0 = Front, 1 = Multiport, 2 = RS232, 3 = Legacy Socket,
4 = USB, 5 = Web Interface, 6 = Binary Socket

3.2　LED Channel Settings

3.2.1　Demo Mode (RGBW Model Only)

&D#　　Gets/Sets if the unit is operating in demo mode. This command is for RGBW units to
demonstrate color mixing possibilities.
Input Options (#): 0 = Disable, 1 = Enable, ? = Query
Return string: **&dX**
Return value (**X**): 0 = Disable, 1 = Enable

3.2.2　Combined Trigger

&J0,#　　Control to combine all inputs together. When enabled, input to any channel behaves as
if all inputs were wired together.
Input Option (#): 0 = Disabled, 1 = Enabled, ? = Query
Return string: **&j0,X**
Return value (**X**): 0 = Disabled, 1 = Enabled

3.2.3　Knob Mode

&N#　　Gets/Sets the function of the front knob.
Input Options (#): 0 = Common, 1 – 4 = Channel, 5 = Demo Mode,
? = Query
Return string: **&nX**
Return value (**X**): 0 = Common, 1 – 4 = Channel, 5 = Demo Mode

3.2.4　Single Channel Operation

&B#　　Gets/Sets if the driver is single or quad channel.
Input Options (#): 0 = Quad, 1 = Single, ? = Query
Return string: **&bX**
Return value (**X**): 0 = Quad, 1 = Single

3.2.5

Legacy Protocol

Controls

3.2.6   Shut-Down Pin

&J#,#   Gets/Sets the behavior of the digital inputs on the Multiport connector. Default is Active Low, where a low signal (GND) will turn off that channel of the LED.
First Input Option (#): 1 – 4 = Channel
Second Input Option (#): 0 = Active Low, 1 = Active High, ? = Query
Return string: **&jX,Y**
Return value (**X**): 1 – 4 = Channel
Return value (**Y**): 0 = Active Low, 1 = Active High

3.2.7   Output Enable (Front Switch)

3.2.7.1   *Legacy*

&L#   Gets/Sets if the LED control loop is active. This is equivalent to pressing the button on the front of the unit.
Input Options (#): 0 = Disabled, 1 = Enabled, ? = Query
Return string: **&lX**
Return value (**X**): 0 = Disabled, 1 = Enabled

3.2.7.2   *CV-LS*

&L#,#   Gets/Sets if the LED control loop is active.
First Input Option (#): 0 = Common, 1 – 4 = Channel
Second Input Option (#): 0 = Disabled, 1 = Enabled, ? = Query
Return string: **&lX,Y**
Return value (**X**): 0 = Common, 1 – 4 = Channel
Return value (**Y**): 0 = Disabled, 1 = Enabled

Legacy Protocol

Controls

3.2.8   Output Power (Front Knob)

3.2.8.1   Legacy

&I#   Gets/Sets the common power limit for the LED. This has the same effect as turning the front knob.
Input Options (#): 0 – FF = LED Power in HEX, ? = Query
Return string: **&iX**
Return value (**X**): 00 – FF = LED Power in 2 digit HEX

&IP#   Gets/Sets the common power limit for the LED with High Resolution. This has the same effect as turning the front knob.
Input Options (#): 0 – 7FF = LED Power in HEX, ? = Query
Return string: **&ipX**
Return value (**X**): 000 – 7FF = LED Power in 3 digit HEX

3.2.8.2   CV-LS

&I#,#   Gets/Sets the power limit for the LED.
First Input Option (#): 0 = Common, 1 – 4 = Channel
Second Input Option (#): 0 – 1000 = Channel Power, ? = Query
Return string: **&iX,Y**
Return value (**X**): 0 = Common, 1 – 4 = Channel
Return value (**Y**): 0 – 1000 = Channel Power

Legacy Protocol

Controls

3.3   Continuous Strobe

3.3.1   Continuous Strobe Enable

&RM#   Gets/Sets if the continuous strobe mode is enabled.
Input Options (#): 0 = Disabled, 1 = Enabled, ? = Query
Return string: **&rmX**
Return value (**X**): 0 = Disabled, 1 = Enabled

3.3.2   Single Channel Operation

&RB#   Gets/Sets if the unit will behave as a single channel device during continuous strobe.
Input Options (#): 0 = Quad Channel Mode, 1 = Single Channel Mode,
? = Query
Return string: **&rbX**
Return value (**X**): 0 = Quad Channel Mode, 1 = Single Channel Mode

3.3.3   Frequency

&RF#   Gets/Sets the frequency that the continuous strobe operates at.
Input Options (#): 6 – 20000 = Frequency in Hz, ? = Query
Return string: **&rfX**
Return value (**X**): 6 – 20000 = Frequency in Hz

3.3.4   Duty Cycle

3.3.4.1   Legacy

&RD#   Gets/Sets the time that the LED is active during the strobe event.
Input Options (#): 0 – 1000 = Duty Cycle, ? = Query
Return string: **&rdX**
Return value (**X**): 0 – 1000 = Duty Cycle

3.3.4.2   CV-LS

&RD#,#   Gets/Sets the time that the LED channel is active during the strobe event.
First Input Option (#): 1 – 4 = Channel
Second Input Option (#): 0 – 1000 = Duty Cycle, ? = Query
Return string: **&rdX,Y**
Return value (**X**): 1 – 4 = Channel
Return value (**Y**): 0 – 1000 = Duty Cycle

Legacy Protocol

Controls

3.3.5   Phase Shift

3.3.5.1   Legacy
&RP#   Gets/Sets the amount of offset from the internal trigger.
     Input Options (#): 0 – 1000 = Phase Shift, ? = Query
     Return string: **&rpX**
     Return value (**X**): 0 – 1000 = Phase Shift

3.3.5.2   CV-LS
&RP#,#   Gets/Sets the amount of offset per channel from the internal trigger.
     First Input Option (#): 1 – 4 = Channel
     Second Input Option (#): 0 – 1000 = Phase Shift, ? = Query
     Return string: **&rpX,Y**
     Return value (**X**): 1 – 4 = Channel
     Return value (**Y**): 0 – 1000 = Phase Shift

3.3.6   Waveform Polarity
&RJ#,#   Gets/Sets whether the active part of the waveform has the LED On or Off. The LED will be on with an Active High setting, or Off with an Active Low setting, during the set Duty Cycle %.
     First Input Option (#): 1 – 4 = Channel
     Second Input Option (#): 0 = Active Low, 1 = Active High, ? = Query
     Return string: **&rjX,Y**
     Return value (**X**): 1 – 4 = Channel
     Return value (**Y**): 0 = Active Low, 1 = Active High

Legacy Protocol

Controls

3.4   *Triggered Strobe*

3.4.1   Triggered Strobe Enable

&PM#   Gets/Sets if the triggered strobe mode is enabled.
Input Options (#): 0 = Disabled, 1 = Enabled, ? = Query
Return string: **&pmX**
Return value (**X**): 0 = Disabled, 1 = Enabled

3.4.2   Combined Trigger

&PJ0,#   Gets/Sets if the system will use an input on any digital input to trigger all channels simultaneously.
Input Options (#): 0 = Disable, 1 = Enable, ? = Query
Return string: **&pj0,X**
Return value (**X**): 0 = Disable, 1 = Enable

3.4.3   Single Channel Operation

&PB#   Gets/Sets if the unit will behave as a single channel device during triggered strobe.
Input Options (#): 0 = Quad Channel Mode, 1 = Single Channel Mode,
? = Query
Return string: **&pbX**
Return value (**X**): 0 = Quad Channel Mode, 1 = Single Channel Mode

3.4.4   Delay

3.4.4.1   *Legacy*

&PD#   Gets/Sets the time delay between arrival of a trigger input and the LED emitting light. There is a system delay of 4-9 microseconds, followed by the variable delay.
Input Options (#): 0 – 1000000 = Delay in Microseconds, ? = Query
Return string: **&pdX**
Return value (**X**): 0 – 1000000 = Delay in Microseconds

Note: For backwards compatibility return value will be padded with leading zeros to have at least 4 digits.

3.4.4.2   *CV-LS*

&PD#,#   Gets/Sets the time delay between arrival of a trigger input and the LED emitting light. There is a system delay of 4-9 microseconds, followed by the variable delay.
First Input Option (#): 1 – 4 = Channel
Second Input Option (#): 0 – 1000000 = Delay in Microseconds,
? = Query
Return string: **&pdX,Y**
Return value (**X**): 1 – 4 = Channel
Return value (**Y**): 0 – 1000000 = Delay in Microseconds

Legacy Protocol

Controls

3.4.5   On Time

3.4.5.1   *Legacy*
&PO#   Gets/Sets the time that the LED channel is active during the strobe.
Input Options (#): 0 – 1000000 = On Time in Microseconds, ? = Query
Return string: **&poX**
Return value (**X**): 0 – 1000000 = On Time in Microseconds

Note: For backwards compatibility, any value will be accepted, but the internal timer has a 5 microsecond resolution.

3.4.5.2   *CV-LS*
&PO#,#   Gets/Sets the time that the LED channel is active during the strobe.
First Input Option (#): 1 – 4 = Channel
Second Input Option (#): 0 – 1000000 = On Time in Microseconds,
? = Query
Return string: **&poX,Y**
Return value (**X**): 1 – 4 = Channel
Return value (**Y**): 0 – 1000000 = On Time in Microseconds

Note: For backwards compatibility, any value will be accepted, but the internal timer has a 5 microsecond resolution.

3.4.6   Trigger Edge
&PJ#,#   Gets/Sets if the system triggers on the Rising or Falling edge of an input signal.
First Input Option (#): 1 – 4 = Channel
Second Input Option (#): 0 = Rising Edge, 1 = Falling Edge, ? = Query
Return string: **&pjX,Y**
Return value (**X**): 1 – 4 = Channel
Return value (**Y**): 0 = Rising Edge, 1 = Falling Edge

Legacy Protocol

Controls

3.5   Equalizer

3.5.1   Equalizer Enable

&E#   Gets/Sets if the system equalizer is enabled.
Input Options (#): 0 = Disable, 1 = Enable, ? = Query
Return string: **&eX**
Return value (**X**): 0 = Disable, 1 = Enable

3.5.2   Start-up Delay

&EI#   Gets/Sets the time delay from turning on the unit to passing control of the light output
to the equalizer control loop.
Input Options (#): 0 – 500 = Delay in Decimal Format, ? = Query
Return string: **&eiX**
Return value (**X**): 0 – 500 in 3 digit Decimal Format "&eeXXX"

3.5.3   Target Light Output

&EE#   Gets/Sets the target value used in the equalizer control loop.
Input Options (#): 0 – 4095 = Target Value in Hex Format, ? = Query
Return string: **&eeX**
Return value (**X**): 0 – 4095 in 3 digit Hex Format "&eeXXX"

3.5.4   Current Light Output

&EV?   Returns the current Light Feed Back value used in the equalizer control loop. This value
is averaged over time from the raw Light Feed Back (LFB) value of the system.
Return string: **&evX**
Return value (**X**): 0 – 4095 in 3 digit Hex Format "&eeXXX"

Note: Unit will accept command without (?) for backwards compatibility.

3.5.5   Equalizer Output

&ED?   Gets the current output power from the equalizer control loop in Hex format.
Return string: **&edX**
Return value (**X**): 0 – 4095 in 3 digit Hex Format "&edXXX"

Note: Unit will accept command without (?) for backwards compatibility.

Legacy Protocol

Controls

3.6   Fan Settings

3.6.1   Manual Fan Control

&GE#   Gets/Sets the fan override control. When the fan override is active, the fan will turn on to the set speed regardless of the state of the unit. The fan will remain on for 15 seconds after the last fan setting change.
Input Options (#): 0 = Auto Mode, 1 = Manual Mode, ? = Query
Return string: **&geX**
Return value (**X**): 0 = Auto Mode, 1 = Manual Mode

3.6.2   Fan Speed

&GS#   Gets/Sets the fan speed set point control.
Input Options (#): 0 = Auto Input Options (#): 0 – 1000 = Target Speed, ? = Query
Return string: **&gsX**
Return value (**X**): 0 – 1000 = Target Speed

4   Settings

4.1   General

4.1.1   Login Timeout

&HTE#   Gets/Sets the timeout enable for login sessions on all interfaces.
Input Options (#): 0 = Disable, 1 = Enable, ? = Query
Return string: **&hteX**
Return value (**X**): 0 = Disable, 1 = Enable

&HT#   Gets/Sets the timeout settings for login sessions on all interfaces.
Input Options (#): 1 – 30 = Timeout in Minutes, ? = Query
Return string: **&htX**
Return value (**X**): 1 – 30 = Timeout in Minutes

4.1.2   Require Login

&HRA#   Gets/Sets the requirement to login for ADMIN level pages.
Input Options (#): 0 = Disable, 1 = Enable, ? = Query
Return string: **&hraX**
Return value (**X**): 0 = Disable, 1 = Enable

&HRC#   Gets/Sets the requirement to login for USER level pages.
Input Options (#): 0 = Disable, 1 = Enable, ? = Query
Return string: **&hrcX**
Return value (**X**): 0 = Disable, 1 = Enable

4.1.3   Allow Browser Save Password

&HS#   Gets/Sets whether a web browser will offer to remember passwords to the user when logging in.
Input Options (#): 0 = Disable, 1 = Enable, ? = Query
Return string: **&hsX**
Return value (**X**): 0 = Disable, 1 = Enable

Legacy Protocol

Settings

4.1.4   Controls Lockout

4.1.4.1   *Legacy*

&K#   Gets/Sets which external inputs are enabled on the unit.
Input Options (#): 0 = No Lockouts, 1 = Front Lockout Only, 2 = Multiport Lockout Only,
3 = Both Front and Multiport Lockout, ? = Query
Return string: **&kX**
Return value (**X**): 0 = No Lockouts, 1 = Front Lockout Only, 2 = Multiport Lockout Only,
3 = Both Front and Multiport Lockout

4.1.4.2   *CV-LS*

&HLF#   Gets/Sets the lockout status of the front switch and front knob on the unit.
Input Options (#): 0 = Disable, 1 = Enable, ? = Query
Return string: **&hlfX**
Return value (**X**): 0 = Disable, 1 = Enable

Note: Front Button will still respond to factory reset override, even when the front
controls are locked out.

&HLM#   Gets/Sets the lockout status of the analog controls on the Multiport.
Input Options (#): 0 = Disable, 1 = Enable, ? = Query
Return string: **&hlmX**
Return value (**X**): 0 = Disable, 1 = Enable

Note: Digital inputs will still respond allowing for remote switch controls of the unit.

Legacy Protocol

Settings

4.2   Network

4.2.1   Connection Status

&AU?   Gets the network interface's connection status.
Return string: **&auX**
Return value (**X**): 1 = Net Connection Present, 0 = No Net Connection

Note: Current driver does not support this function, so command will always return **&au1**.

4.2.2   Hostname

&AH#   Gets/Sets the network host name of the unit. This string appears in the network finder application, and can be used to distinguish units on the network.
Input Options (#): Host Name String (no space), ? = Query
Return string: **&ahX**
Return value (**X**): Host Name String

4.2.3   DHCP

&AM#   Gets/Sets if DHCP is enabled.
Input Options (#): 0 = Disabled, 1 = Enabled, 2 = Restart Stack, ? = Query
Return string: **&amX**
Return value (**X**): 0 = Disabled, 1 = Enabled, 2 = Restarting Stack

4.2.4   IP Address

&AID?   Gets the network interface's Dynamically assigned IP.
Return string: **&aidX**
Return value (**X**): IP in format "xxx:xxx:xxx:xxx"

Note: If DHCP is disabled command will return "000:000:000:000" for the IP address.
Note: Unit will accept command without (?) for backwards compatibility.

&AIS#   Gets/Sets the network interface's static IP.
Input Options (#): IP address, ? = Query
Return string: **&aisX**
Return value (**X**): IP in format "xxx:xxx:xxx:xxx"

Note: Unit will accept IP addresses separated with ":" and leading 0's for backwards compatibility, but will also accept standard format IP addresses.

Legacy Protocol

Settings

4.2.5   Subnet Mask

&ASD?   Gets the network interface's Dynamically assigned Subnet Mask.
Return string: **&asdX**
Return value (**X**): Mask in format "xxx:xxx:xxx:xxx"

Note: If DHCP is disabled command will return "000:000:000:000" for the IP address.
Note: Unit will accept command without (?) for backwards compatibility.

&ASS#   Gets/Sets the network interface's static Subnet Mask.
Input Options (#): Mask address, ? = Query
Return string: **&assX**
Return value (**X**): Mask in format "xxx:xxx:xxx:xxx"

Note: Unit will accept Subnet Mask separated with ":" and leading 0's for backwards compatibility, but will also accept standard format Subnet Mask.

4.2.6   Gateway

&AGD?   Gets the network interface's Dynamically assigned gateway IP.
Return string: **&agdX**
Return value (**X**): IP in format "xxx:xxx:xxx:xxx"

Note: If DHCP is disabled command will return "000:000:000:000" for the IP address.
Note: Unit will accept command without (?) for backwards compatibility.

&AGS#   Get/Set the network interface's static gateway IP.
Input Options (#): IP address, ? = Query
Return string: **&agsX**
Return value (**X**): IP in format "xxx:xxx:xxx:xxx"

Note: Unit will accept IP addresses separated with ":" and leading 0's for backwards compatibility, but will also accept standard format IP addresses.

Legacy Protocol

Settings

4.2.7   Preferred DNS

&ADD?   Gets the network interface's Dynamically assigned primary DNS IP.
                Return string: **&addX**
                Return value (**X**): Primary DNS IP in format "xxx:xxx:xxx:xxx"

                Note: If DHCP is disabled command will return "000:000:000:000" for the IP address.
                Note: Unit will accept command without (?) for backwards compatibility.

&ADS#   Get/Set the network interface's static primary DNS IP.
                Input Options (#): IP address, ? = Query
                Return string: **&adsX**
                Return value (**X**): Primary DNS IP in format "xxx:xxx:xxx:xxx"

                Note: Unit will accept IP addresses separated with ":" and leading 0's for backwards
                compatibility, but will also accept standard format IP addresses.

4.2.8   Alternate DNS

&AED?   Gets the network interface's Dynamically assigned secondary DNS IP.
                Return string: **&aedX**
                Return value (**X**): IP in format "xxx:xxx:xxx:xxx"

                Note: If DHCP is disabled command will return "000:000:000:000" for the IP address.
                Note: Unit will accept command without (?) for backwards compatibility.

&AES#   Gets/Sets the network interface's static secondary DNS IP.
                Input Options (#): IP address, ? = Query
                Return string: **&aesX**
                Return value (**X**): IP in format "xxx:xxx:xxx:xxx"

                Note: Unit will accept IP addresses separated with ":" and leading 0's for backwards
                compatibility, but will also accept standard format IP addresses.

Legacy Protocol

Settings

4.3   Sockets

4.3.1   Legacy Ethernet Socket

4.3.1.1   Enable
&ALE#   Gets/Sets if the socket is enabled.
                   Input Options (#): 0 = Disabled, 1 = Enabled, ? = Query
                   Return string: **&aleX**
                   Return value (**X**): 0 = Disabled, 1 = Enabled

4.3.1.2   Port

4.3.1.2.1   Legacy
&AP#   Gets/Sets the socket port.
                   Input Options (#): 0 - 65535 = Port Number, ? = Query
                   Return string: **&apX**
                   Return value (**X**): 0 – 65535

4.3.1.2.2   CV-LS
&ALP#   Gets/Sets the socket port.
                   Input Options (#): 0 - 65535 = Port Number, ? = Query
                   Return string: **&alpX**
                   Return value (**X**): 0 – 65535

4.3.1.3   Connected IP
&ALK?   Query the IP address of the currently connected user of the socket.
                   Return string: **&alkX**
                   Return value (**X**): IP in format "x.x.x.x"

4.3.1.4   Kick
&ALK   Forcefully disconnect current user from the socket.
                   Return string: **&alk**

Legacy Protocol

Settings

4.3.2   Binary Ethernet Socket

4.3.2.1   *Enable*

&ABE#   Controls if the socket is enabled.
Input Options (#): 0 = Disabled, 1 = Enabled, ? = Query
Return string: **&abeX**
Return value (**X**): 0 = Disabled, 1 = Enabled

4.3.2.2   *Port*

&ABP#   Gets/Sets the socket port.
Input Options (#): 0 - 65535 = Port Number, ? = Query
Return string: **&abpX**
Return value (**X**): 0 - 65535

4.3.2.3   *Connected IP*

&ABK?   Query the IP address of the currently connected user of the socket.
Return string: **&abkX**
Return value (**X**): IP in format "x.x.x.x"

4.3.2.4   *Kick*

&ABK   Forcefully disconnect current user from the socket.
Return string: **&abk**

Legacy Protocol

Settings

4.4 UART

4.4.1 Baud Rate

&UB#   Gets/Sets the baud rate of the UART port.
Input Options (#): ? = Query,
0 = 110,
1 = 300,
2 = 600,
3 = 1200,
4 = 2400,
5 = 4800,
6 = 9600,
7 = 14400,
8 = 19200,
9 = 38400,
10 = 57600,
11 = 115200,
12 = 230400,
13 = 460800,
14 = 921600
Return string: **&ubX**
Return value (**X**): See Input Options

4.4.2 Parity

&UP#   Gets/Sets the parity of the UART port.
Input Options (#): 0 = None, 1 = Even, 2 = Odd, ? = Query
Return string: **&upX**
Return value (**X**): 0 = None, 1 = Even, 2 = Odd

4.4.3 Stop Bits

&US#   Gets/Sets the stop bits of the UART port.
Input Options (#): 1 = 1 Stop Bit, 2 = 2 Stop Bits, ? = Query
Return string: **&usX**
Return value (**X**): 1 = 1 Stop Bit, 2 = 2 Stop Bits

4.4.4 Restart

&UR   Command restarts the UART module to apply new settings.
Return string: **&ur**

5 Other Commands

5.1 Erase Error Logs

&03 This command will clear the error log list.
    Return string: **&o3**

5.2 System Reboot

&04 This command will cause the unit to perform a full reboot. This is equivalent to power cycling the unit.
    Return string: **&o4**