

SECTION FIVE: EXTERNAL COMPUTER CONTROL

How to Interface the Chameleon Ultra or Chameleon Vision Laser

This section provides details on how to interface a Chameleon Ultra or Chameleon Vision V-18 laser to a remote computer via the RS-232 connector on the rear of the power supply.

The RS-232 interface is based on a set of laser control instructions, consisting of commands that affect laser operation and queries that request the laser to return status information to the host. The instruction set is sufficient to support user-written programs that emulate the functions of the Chameleon Ultra or Chameleon Vision front panel.

RS-232 Command Language

Instruction Syntax for RS-232 Communication

Communication with the Chameleon Ultra or Chameleon Vision is with two types of instructions:

- Commands that set the values of laser operating parameters.
- Queries which request the laser to return the value of an operating parameter.

Any instruction to the laser consists of a command or query written as a string of ASCII characters and terminated by a carriage return and linefeed (<CR><LF>) or a semicolon (;).

For example:

LASER = 1<CR><LF>

Switches the Chameleon Ultra or Chameleon from STANDBY to ON.

?LIGHT<CR><LF>

Requests the laser to return the measured laser output power.

The laser always responds to an instruction by returning a message terminated by a carriage return and linefeed. Table 5-1 lists the possible responses from the laser.

Table 5-1. Response from Laser after Receiving Instruction

INSTRUCTION SENT TO LASER	RESPONSE FROM LASER			
	ECHO OFF PROMPT OFF	ECHO OFF PROMPT ON	ECHO ON PROMPT OFF	ECHO ON PROMPT ON
Command + <CR><LF>	<CR><LF>	Chameleon><CR><LF>	Command + <CR><LF>	Chameleon> Command + <CR><LF>
Query + <CR><LF>	Data + <CR><LF>	Chameleon> Data + <CR><LF>	Query + Data + <CR><LF>	Chameleon> Query + Data + <CR><LF>
Command + <CR><LF> (Illegal operand)	RANGE ERROR: + Command + <CR><LF>	Chameleon> RANGE ERROR: + Command + <CR><LF>	Command + RANGE ERROR: + Command + <CR><LF>	Chameleon> Command + RANGE ERROR: + Command + <CR><LF>
Command <CR><LF> (Illegal instruction)	Command Error: + Command + <CR><LF>	Chameleon> Command Error: + Command + <CR><LF>	Command + Command Error: + Command + <CR><LF>	Chameleon> Command + Command Error: + Command + <CR><LF>
Query<CR><LF> (Illegal instruction)	Query Error: + Query + <CR><LF>	Chameleon> Query Error: + Query + <CR><LF>	Query + Query Error: + Query + <CR><LF>	Chameleon> Query + Query Error: + Query + <CR><LF>

I. Multiple items are separated by the “&” character. For example, a list of system faults is returned as “3&5&6.”



For proper handshaking, communication programs should wait until the <CR><LF> has been returned from the laser before sending the next instruction.

ECHO Mode

The Chameleon Ultra or Chameleon Vision provides an “echo” mode in which each character transmitted to the laser is echoed to the host. This feature can be turned on or off using the ECHO command.

PROMPT Mode

The Chameleon Ultra or Chameleon Vision provides a “prompt” mode for terminal operation in which the laser returns; for example, “Chameleon>” after each command. This feature can be turned on or off using the “PROMPT” command.

?

The single character “?” may be substituted for “PRINT” in all queries. For example:

?LIGHT is equivalent to **PRINT LIGHT**

= or :

The single characters = and : are equivalent delimiters between text and data in all commands. For example:

LASER = 0 is equivalent to **LASER: 0**

RS-232 Interface Connection

The Chameleon Ultra or Chameleon Vision Laser's RS-232 port configuration is described in Table 5-2 and typical cable requirements are shown in Figure 5-1. The 9-pin RS-232 port is configured as data communications equipment (DCE) device using only pins 2 (serial data out), 3 (serial data in) and 5 (signal ground). Handshake lines RTS, CTS, DTR and DSR (pins 4, 6, 7 and 8) are not used and have no connections inside the power supply.

RS-232 Port Configuration

Table 5-2. RS-232 Port Description

CONFIGURATION	DCE, NO HANDSHAKING
Data bits	8
Stop bits	1
Parity	none
Baud rate	User selectable: 1200 2400 4800 9600 19200 (default factory setting) 38400 57600

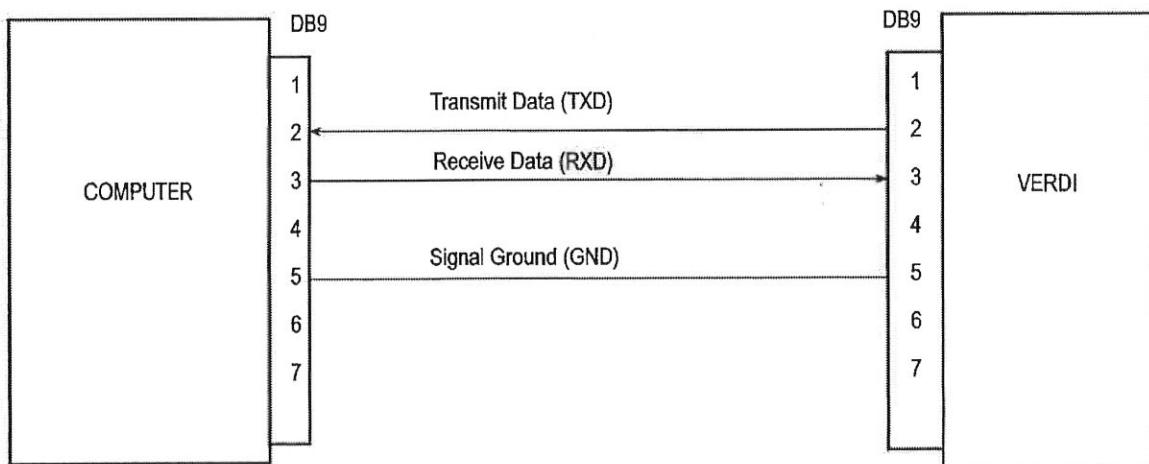


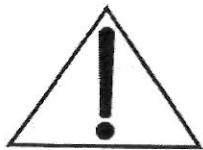
Figure 5-1. RS-232 Pin Configuration

Setting The Baud Rate

The baud rate of the 9-pin RS-232 port can be adjusted through the “RS-232 Baudrate Setup” menu on the front panel (Figure 4-3 on page 4-10) or via the SERIAL BAUDRATE = NNN command described in Table 5-1 and Table 5-2. After the baud rate is changed, the new setting is used until it is changed even if the system power is switched off.

To set the baud rate by the remote computer, send the **SERIAL BAUDRATE = NNN** command to the laser at the currently set baud rate. After sending this baud rate command, host computer communications port must be reinitialized to the new baud rate.

The factory set baud rate is 19200.



When an RS-232 command is issued to change a setting, the display may not update to reflect the changes taking place in the system. The user should press MENU EXIT and MENU SELECT to update the display.

Instruction Set

Table 5-3 (below) and Table 5-4 on page 5-8 describe the instructions (long and short forms) for use in RS-232 with the Chameleon Ultra. Table 5-5 on page 5-14 and Table 5-6 on page 5-15 describe the additional instructions available with the Chameleon Vision.

Table 5-3. Chameleon Ultra RS-232 Commands

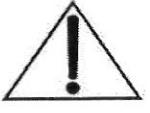
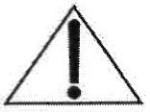
COMMANDS	ACTION PERFORMED
BAUDRATE=nnnnn B=n	Sets the RS-232 Serial port baud rate to the specified value. nnnnn = 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200.
ECHO=n E=n	A change in echo mode takes effect with the first command sent after the echo command. n = 0 Turns echo off. Characters transmitted to the laser are not echoed to the host. n = 1 Turns echo on. Characters transmitted to the laser are echoed to the host.
FLASH=1 FL=1	Flash Verdi laser output below lasing threshold to allow single-frequency mode to recenter.
HOME STEPPER=1 HM=1	Homes the tuning motor. This action can take 3-30 seconds.
LASER=n L=n	Changes mode. n = 0 Puts laser in STANDBY  Turning the keyswitch to STANDBY and then to the ON position overrides this command. <hr/> n = 1 Resets faults and turns laser on. Clears fault screen on power supply and fault history (?FAULT HISTORY), so lasing resumes if there are no active faults.  Keyswitch must be in the ON position. <hr/>
LBO HEATER=n LBOH=n	Turns LBO heater on/off. n = 0 Off (cool down) n = 1 On (heating)
LBO OPTIMIZE=n LBOOPT=n	Begins optimization routine. n = 0 Indicates that no optimization is currently in process n = 1 Begins optimization routine

Table 5-3. Chameleon Ultra RS-232 Commands (Continued)

COMMANDS	ACTION PERFORMED
LOCK FRONT PANEL=n LFP=n	Enables/disables user input from the front panel. n = 1 Disabled n = 0 Enabled
PROMPT=n >=n	Turns "VERDI>" prompt on/off. n = 0 Off n = 1 On
SEARCH MODELOCK=n SM=n	Enables/disables search for modelocking n = 0 Enabled n = 1 Disabled
SHUTTER=n S=n	Changes state of the external shutter. n = 0 Closed n = 1 Open
WAVELENGTH=nnn VW=nnn	Sets the Chameleon Ultra wavelength to the specified value in nanometers. If the specified wavelength is beyond the lower or upper wavelength limit, the wavelength is set to the lower or upper limit.
WAVELENGTH STEP=nnn VWS=n	Changes the Chameleon Ultra wavelength by the specified amount in nanometers.
HOME STEPPER = n HM=n	Homes the tuning motor (this action can take between 3 to 30 seconds)
HEARTBEAT=n HB=n	When enabled, shuts the laser down if no RS-232 activity occurs within a time specified by the heartbeat rate (HBR). n = 1 Enables heartbeat n = 0 Disables heartbeat
HEARTBEATRATE=nnn HBR= nnn	Specifies to time-out period (between 1 to 100 seconds) for laser shut down in the absence of RS-232 activity.
RECOVERY=1 REQ=1	Initiates recovery sequence. This action can take up to 2 minutes to complete.
ALIGN=n	Accesses alignment mode n = 1 Enters alignment mode n = 0 Exits alignment mode

Table 5-4. Chameleon Ultra RS-232 Query Set (Sheet 1 of 6)

QUERIES	RETURNED INFORMATION																																																				
PRINT LASER ?L	Returns status of the laser: 0 = Off (standby) 1 = On 2 = Off due to a fault (check faults or fault history)																																																				
PRINT KEYSWITCH ?K	Returns status of the keyswitch: 0 = Off 1 = On																																																				
PRINT FAULTS ?F	Returns a list of number codes of all active faults, separated by an "&" or Returns "System OK" if there are no active faults <table> <tbody> <tr><td>0 = no faults</td><td>31 = Shutter State Mismatch</td></tr> <tr><td>1 = Laser Head Interlock Fault</td><td>32 = CPU PROM Checksum Fault</td></tr> <tr><td>2 = External Interlock Fault</td><td>33 = Head PROM Checksum Fault</td></tr> <tr><td>3 = PS Cover Interlock Fault</td><td>34 = Diode 1 PROM Checksum Fault</td></tr> <tr><td>4 = LBO Temperature Fault</td><td>35 = Diode 2 PROM Checksum Fault</td></tr> <tr><td>5 = LBO Not Locked at Set Temp</td><td>36 = CPU PROM Range Fault</td></tr> <tr><td>6 = Vanadate Temp. Fault</td><td>37 = Head PROM Range Fault</td></tr> <tr><td>7 = Etalon Temp. Fault</td><td>38 = Diode 1 PROM Range Fault</td></tr> <tr><td>8 = Diode 1 Temp. Fault</td><td>39 = Diode 2 PROM Range Fault</td></tr> <tr><td>9 = Diode 2 Temp. Fault</td><td>40 = Head - Diode Mismatch</td></tr> <tr><td>10 = Baseplate Temp. Fault</td><td>43 = Lost Modelock Fault</td></tr> <tr><td>11 = Heatsink 1 Temp. Fault</td><td>47 = Ti-Sapph Temp. Fault</td></tr> <tr><td>12 = Heatsink 2 Temp. Fault</td><td>49 = PZT X Fault</td></tr> <tr><td>16 = Diode 1 Over Current Fault</td><td>50 = Cavity Humidity Fault</td></tr> <tr><td>17 = Diode 2 Over Current Fault</td><td>51 = Tuning Stepper Motor Homing</td></tr> <tr><td>18 = Over Current Fault</td><td>52 = Lasing Fault</td></tr> <tr><td>19 = Diode 1 Under Volt Fault</td><td>53 = Laser Failed to Begin Modelocking</td></tr> <tr><td>20 = Diode 2 Under Volt Fault</td><td>54 = Headboard Communication Fault</td></tr> <tr><td>21 = Diode 1 Over Volt Fault</td><td>55 = System Lasing Fault</td></tr> <tr><td>22 = Diode 2 Over Volt Fault</td><td>56 = PS-Head EEPROM Mismatch Fault</td></tr> <tr><td>25 = Diode 1 EEPROM Fault</td><td>57 = Modelock Slit Stepper Motor Homing Fault</td></tr> <tr><td>26 = Diode 2 EEPROM Fault</td><td>58 = CHAMELEON_VERDIEPROM_FAULT</td></tr> <tr><td>27 = Laser Head EEPROM Fault</td><td>59 = CHAMELEON_PRECOMPENSATOR_HOMING_FAULT</td></tr> <tr><td>28 = PS EEPROM Fault</td><td>60 = CHAMELEON_CURVEEPROM_FAULT</td></tr> <tr><td>29 = PS-Head Mismatch Fault</td><td></td></tr> <tr><td>30 = LBO Battery Fault</td><td></td></tr> </tbody> </table>	0 = no faults	31 = Shutter State Mismatch	1 = Laser Head Interlock Fault	32 = CPU PROM Checksum Fault	2 = External Interlock Fault	33 = Head PROM Checksum Fault	3 = PS Cover Interlock Fault	34 = Diode 1 PROM Checksum Fault	4 = LBO Temperature Fault	35 = Diode 2 PROM Checksum Fault	5 = LBO Not Locked at Set Temp	36 = CPU PROM Range Fault	6 = Vanadate Temp. Fault	37 = Head PROM Range Fault	7 = Etalon Temp. Fault	38 = Diode 1 PROM Range Fault	8 = Diode 1 Temp. Fault	39 = Diode 2 PROM Range Fault	9 = Diode 2 Temp. Fault	40 = Head - Diode Mismatch	10 = Baseplate Temp. Fault	43 = Lost Modelock Fault	11 = Heatsink 1 Temp. Fault	47 = Ti-Sapph Temp. Fault	12 = Heatsink 2 Temp. Fault	49 = PZT X Fault	16 = Diode 1 Over Current Fault	50 = Cavity Humidity Fault	17 = Diode 2 Over Current Fault	51 = Tuning Stepper Motor Homing	18 = Over Current Fault	52 = Lasing Fault	19 = Diode 1 Under Volt Fault	53 = Laser Failed to Begin Modelocking	20 = Diode 2 Under Volt Fault	54 = Headboard Communication Fault	21 = Diode 1 Over Volt Fault	55 = System Lasing Fault	22 = Diode 2 Over Volt Fault	56 = PS-Head EEPROM Mismatch Fault	25 = Diode 1 EEPROM Fault	57 = Modelock Slit Stepper Motor Homing Fault	26 = Diode 2 EEPROM Fault	58 = CHAMELEON_VERDIEPROM_FAULT	27 = Laser Head EEPROM Fault	59 = CHAMELEON_PRECOMPENSATOR_HOMING_FAULT	28 = PS EEPROM Fault	60 = CHAMELEON_CURVEEPROM_FAULT	29 = PS-Head Mismatch Fault		30 = LBO Battery Fault	
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PRINT FAULT HISTORY ?FH	Returns a list of number codes (see ?F) of all faults that have occurred since the last laser on command, separated by an "&", or returns "System OK" if there are no latched faults. The "laser on" command or the EXIT button on the power supply when the fault screen is active clears the fault history and fault screen.																																																				

Table 5-4. Chameleon Ultra RS-232 Query Set (Sheet 2 of 6)

QUERIES	RETURNED INFORMATION
PRINT SHUTTER ?S	Returns the status of the external shutter: 0 = Closed 1 = Open
PRINT UF POWER ?UF	Returns actual UF (Chameleon) power, <i>nnn.nn</i> , in milliwatts.
PRINT CAVITY PEAK HOLD ?PHLDC	Returns the status of the cavity peak hold: 0 = Off 1 = On
PRINT CAVITY PZT MODE ?PZTMC	Returns the mode of the cavity PZT: 0 = Auto 1 = Manual
PRINT CAVITY PZT X ?PZTXC	Returns the cavity PZT X (Rd) voltage, <i>n.nn</i> , in volts.
PRINT CAVITY PZT Y ?PZTYC	Returns the cavity PZT Y (Rd) voltage, <i>n.nn</i> , in volts.
PRINT PUMP PEAK HOLD ?PHLDP	Returns the status of the pump peak hold: 0 = Off 1 = On
PRINT PUMP PZT MODE ?PZTMP	Returns the mode of the pump PZT: 0 = Auto 1 = Manual
PRINT PUMP PZT X ?PZTXP	Returns pump PZT X (Rd) voltage, <i>n.nn</i> , in volts.
PRINT PUMP PZT Y ?PZTYP	Returns pump PZT Y (Rd) voltage, <i>n.nn</i> , in volts.
PRINT POWER TRACK ?PTRK	Returns state of the PowerTrack: 0 = Off 1 = On
PRINT MODELOCKED ?MDLK	Returns state of the Chameleon Ultra: 0 = Off (Standby) 1 = Modelocked 2 = CW
PRINT PUMP SETTING ?PP	Returns pump power setpoint as fraction of QS to CW pump band.

Table 5-4. Chameleon Ultra RS-232 Query Set (Sheet 3 of 6)

QUERIES	RETURNED INFORMATION
PRINT TUNING STATUS ?TS	Returns the tuning status: 0 = Ready (i.e. no tuning operation being performed) 1 = Tuning in progress 2 = Search for Modelock in progress 3 = Recovery operation in progress
PRINT SEARCH MODELOCK ?SM	Returns the status of search for modelocking: 0 = Disabled 1 = Enabled
PRINT HOMED ?HM	Returns the homing status of the tuning motor: 0 = Has not been homed 1 = Has been homed
PRINT WAVELENGTH ?VW	Returns the last commanded UF (Chameleon) wavelength, <i>nnn</i> , in nanometers.
PRINT STEPPER POSITION ?STPRPOS	Returns the position (counts) that the motor was last moved to for a desired tuning.
PRINT CURRENT ?C	Returns the measured average diode current, <i>nn.n</i> , in amps.
PRINT DIODE1 CURRENT ?D1C	Returns laser diode #1 measured current, <i>nn.n</i> , in amps.
PRINT DIODE2 CURRENT ?D2C	Returns laser diode #2 measured current, <i>nn.n</i> , in amps.
PRINT BASEPLATE TEMP ?BT	Returns laser head baseplate measured temperature, <i>nn.nn</i> , in °C.
PRINT DIODE1 TEMP ?D1T	Returns laser diode #1 measured temperature, <i>nn.nn</i> , in °C.
PRINT DIODE2 TEMP ?D2T	Returns laser diode #2 measured temperature, <i>nn.nn</i> , in °C.
PRINT VANADATE TEMP ?VT	Returns vanadate measured temperature, <i>nn.nn</i> , in °C.
PRINT LBO TEMP ?LBOT	Returns LBO measured temperature, <i>nnn.nn</i> , in °C.
PRINT ETALON TEMP ?ET	Returns etalon measured temperature, <i>nn.nn</i> , in °C.
PRINT DIODE1 SET TEMP ?D1ST	Returns laser diode #1 set temperature, <i>nn.nn</i> , in °C.
PRINT DIODE2 SET TEMP ?D2ST	Returns laser diode #2 set temperature, <i>nn.nn</i> , in °C.

Table 5-4. Chameleon Ultra RS-232 Query Set (Sheet 4 of 6)

QUERIES	RETURNED INFORMATION
PRINT VANADATE SET TEMP ?VST	Returns vanadate set temperature, <i>nn.nn</i> , in °C.
PRINT LBO SET TEMP ?LBOST	Returns LBO set temperature, <i>nnn.nn</i> , in °C.
PRINT ETALON SET TEMP ?EST	Returns etalon set temperature, <i>nn.nn</i> , in °C.
PRINT DIODE1 TEMP DRIVE ?D1TD	Returns laser diode #1 temperature servo drive setting.
PRINT DIODE2 TEMP DRIVE ?D2TD	Returns laser diode #2 temperature servo drive setting.
PRINT VANADATE DRIVE ?VD	Returns vanadate temperature servo drive setting.
PRINT LBO DRIVE ?LBOD	Returns LBO temperature servo drive setting.
PRINT ETALON DRIVE ?ED	Returns etalon temperature servo drive setting.
PRINT DIODE1 HEATSINK TEMP ?D1HST	Returns laser diode #1 heat sink measured temperature, <i>nn.nn</i> , in °C.
PRINT DIODE2 HEATSINK TEMP ?D2HST	Returns laser diode #2 heat sink measured temperature, <i>nn.nn</i> , in °C.
PRINT LBO HEATER ?LBOH	Returns the status of the LBO heater: 0 = Off (cooldown) 1 = On (heating)
PRINT LIGHT REG STATUS ?LRS	Returns the status of the light loop servo: 0 = Open (current regulation) 1 = Locked 2 = Seeking 3 = Fault
PRINT DIODE1 SERVO STATUS ?DISS	Returns the status of diode #1 temperature servo: 0 = Open 1 = Locked 2 = Seeking 3 = Fault

Table 5-4. Chameleon Ultra RS-232 Query Set (Sheet 5 of 6)

QUERIES	RETURNED INFORMATION
PRINT DIODE2 SERVO STATUS ?D2SS	Returns the status of diode #2 temperature servo: 0 = Open 1 = Locked 2 = Seeking 3 = Fault
PRINT VANADATE SERVO STATUS ?VSS	Returns the status of the vanadate temperature servo: 0 = Open 1 = Locked 2 = Seeking 3 = Fault
PRINT LBO SERVO STATUS ?LBOSS	Returns the status of the LBO temperature servo: 0 = Open 1 = Locked 2 = Seeking 3 = Fault
PRINT ETALON SERVO STATUS ?ESS	Returns the status of the etalon temperature servo: 0 = Open 1 = Locked 2 = Seeking 3 = Fault
PRINT DIODE1 HOURS ?D1H	Returns the number of operating hours on laser diode #1.
PRINT DIODE2 HOURS ?D2H	Returns the number of operating hours on laser diode #2.
PRINT HEAD HOURS ?HH	Returns the number of operating hours on the system head.
PRINT DIODE1 VOLTAGE ?D1V	Returns the measured voltage across diode #1, <i>n.n</i> , in volts.
PRINT DIODE2 VOLTAGE ?D2V	Returns the measured voltage across diode #2, <i>n.n</i> , in volts.
PRINT SOFTWARE ?SV	Returns the version number of the power supply software.
PRINT MODEM BAUDRATE ?MB	Returns the present modem port baudrate.
PRINT POWER SUPPLY ID ?PI	Returns "2BC" or "2BS" for 2-bar power supply, "1BC" or "1BS" for 1-bar power supply.
PRINT BAT VOLTS ?BV	Returns the measured voltage across the battery, <i>nn.nn</i> , in volts.

Table 5-4. Chameleon Ultra RS-232 Query Set (Sheet 6 of 6)

QUERIES	RETURNED INFORMATION
PRINT AUTOMODELOCK ?AMDLK	Returns the status if the automodelock routing: n = 1 Enabled n = 0 Disabled
PRINT PZT CONTROL STATE ?PZTS	Returns an integer, followed by a space, followed by a short text of the PZT control state as displayed on the PZT Control Screen.
PRINT TUNING LIMIT MAX ?TMAX	Returns value of maximum available wavelength in nm.
PRINT TUNING LIMIT MIN ?TMIN	Returns value of minimum available wavelength in nm.
?ALIGN	Returns the status of the alignment mode: n = 1 Enabled n = 0 Disabled
?ALIGNP	Returns the laser power available in mW with alignment mode enabled.
?ALIGNW	Returns the alignment mode laser wavelength in nm.
?LFP	Returns the lock front panel status. n = 1 Locked n = 0 Unlocked
?PZTXCM	Returns the last power map result for the cavity X PZT position as a percentage of the available range.
?PZTXCP	Returns the current cavity X PZT position as a percentage of the available range.
?PZTXPM	Returns the last power map result for the pump X PZT position as a percentage of the available range.
?PZTXPP	Returns the current pump X PZT position as a percentage of the available range.
?PZTYCM	Returns the last power map result for the cavity Y PZT position as a percentage of the available range.
?PZTYCP	Returns the current cavity Y PZT position as a percentage of the available range.
?PZTYPM	Returns the last power map result for the pump Y PZT position as a percentage of the available range.
?PZTYPP	Returns the current pump Y PZT position as a percentage of the available range.
?RH	Returns the relative humidity as a percentage value.
?SN	Returns the Chameleon Ultra serial number.
?ST	Returns the current operating status as a text string, such as "Starting" or "OK".

Table 5-5. Chameleon Vision RS-232 Commands

COMMANDS	ACTION PERFORMED
GDDCURVE=xx	Sets the GDD calibration curve. xx = curve number This switches the system into auto GDD. Reserve curve 0 for zero dispersion curve.
GDD=xxxxx	Manually sets the GDD value. xxxxx = GDD in fs^2 This switches the system into manual GDD.
GDDCURVEN=xxxxxx	Selects the GDD curve by name xxxxxx
SETCURVEN:x=yyyyyy	Changes the name of calibration curve x to yyyyyy. Note: All curve names are automatically converted to upper case.
SETCURVEPT:ww=x: yyyy:zzzzz	Changes curve ww point x to zzzzz fs^2 at yyyy nm.
DELCURVE=xx	Deletes curve number xx.

Table 5-6. Chameleon Vision RS-232 Query Set

QUERIES	RETURNED INFORMATION
?GDDCURVE	Returns the current calibration curve
?GDD	Query current GDD setting Returns yyyy where yyyy is the GDD in fs2 or yyyy X, where the character X denotes that the value has been extrapolated from limited calibration data
?GDDCURVEN	Returns the current curve by name
?CURVEN	Returns the name of current curve
?CURVEPT:ww=x	Query values of curve ww point x Returns: zzzzz yyyy where zzzzz is GDD, yyyy is wavelength
?CURVE:ww	Query calibration values for curve ww Returns array of calibration points: x1 yyyy1 zzzzz1 x2 yyyy2 zzzzz2 x3 yyyy3 zzzzz3 etc.
?COMP	Returns 0 if pre-compensator disabled, 1 if enabled
?HMCOMP	Query precompensator stepper, Returns 0 if not homed, 1 if homed.
?GDDMAX	Returns the maximum GDD value available at the current wavelength.
?GDDMIN	Returns the minimum GDD value available at the current wavelength.
?GDDMAX:xxxx	Returns the maximum GDD value available at wavelength xxxxnm.
?GDDMIN:xxxx	Returns the minimum GDD value available at wavelength xxxxnm.

