COHERENT
Service Department

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x	Information		

FIELD SERVICE BULLETIN

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Remote Verdi Optimization

PRODUCT

DPSS Glasgow products and DPSS Santa Clara products

PURPOSE

To inform Field Service, Representatives, and Coherent Subsidiaries how to remotely perform Optimization of the Verdi.

DESCRIPTION

The following procedure acts as a guide to help with remotely optimizing the Verdi on Chameleon laser systems by adjustment of the LBO and diode set temperatures. Since the optimization will be performed in light regulation mode the maximum Verdi power that we are able to request is limited to 18.5W.

Note: The Verdi power will be measured from the internal photocell and not from an external power meter.

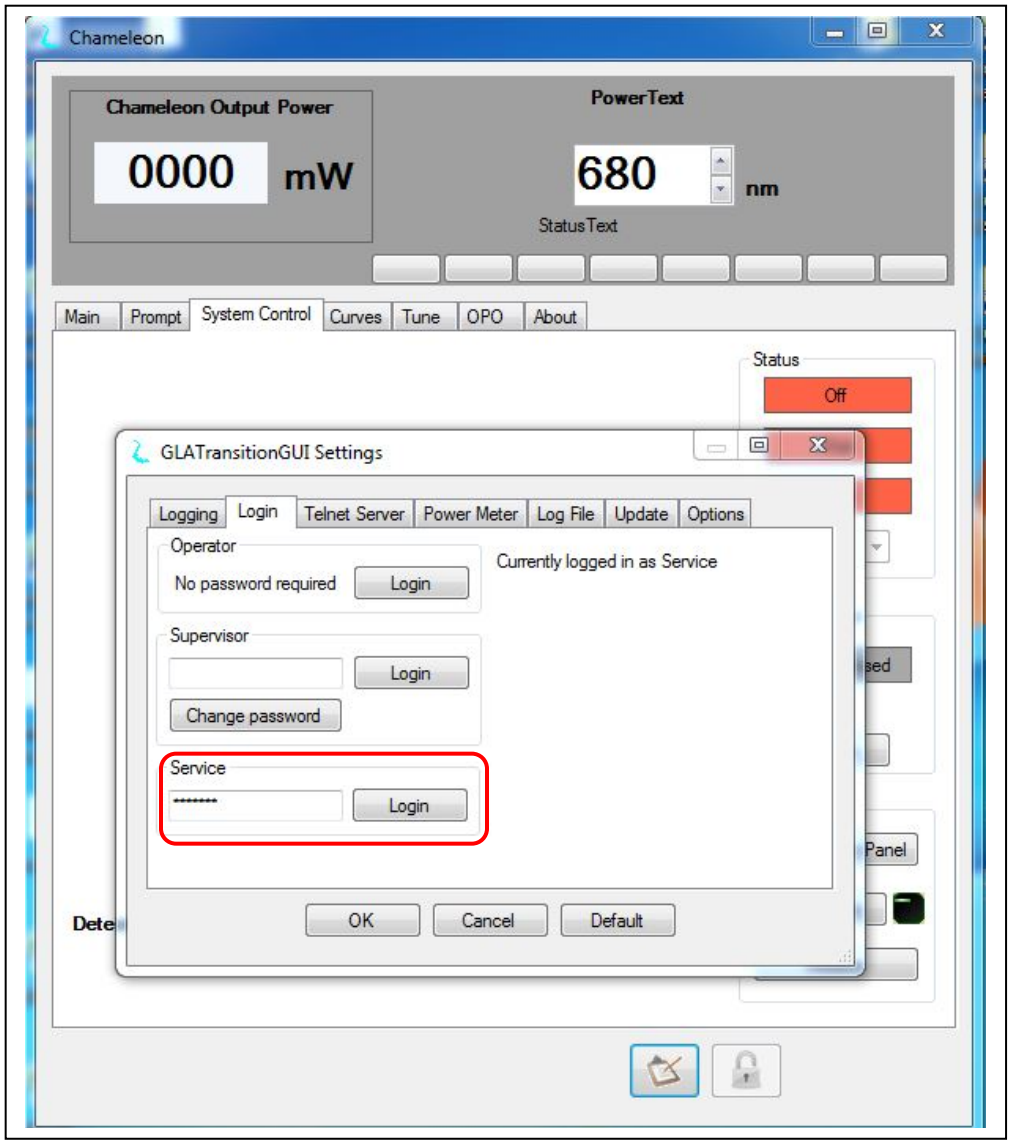
To perform the optimization a remote network link is required to access the user's computer which is physically connected to the Chameleon laser via RS232. The Coherent GUI is required to be installed onto the user's computer if not already available.

Section 1 – Setting up the Chameleon GUI
Section 2 – Optimizing the LBO set temperature
Section 3 – Optimizing the Diode set temperatures
Section 4 – Completing the remote diagnostic session

Section 1 – Setting up the Chameleon GUI

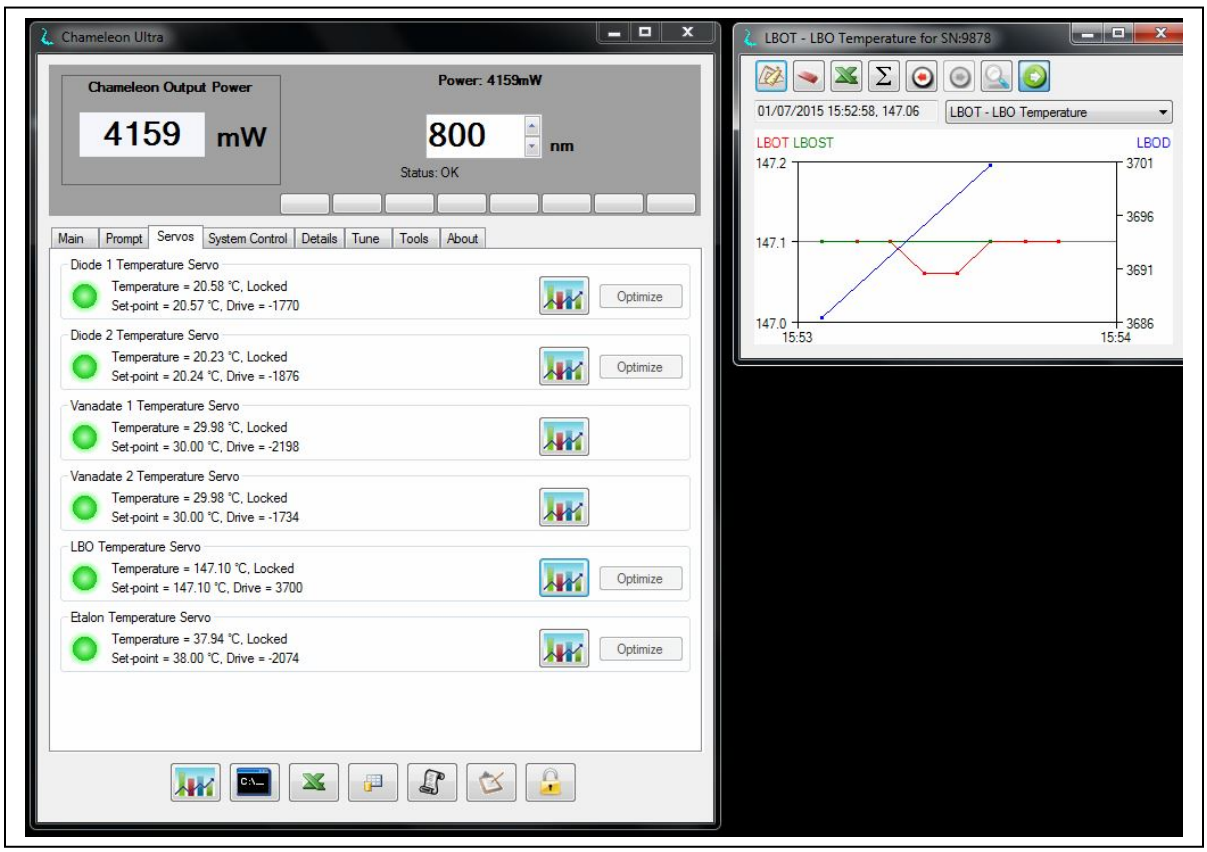
a) Open the Coherent GUI on the remote computer and log into service mode i.e. enter the 'service P/W' under 'Service' then select 'Login'.
See Fig 1a.

Fig 1a



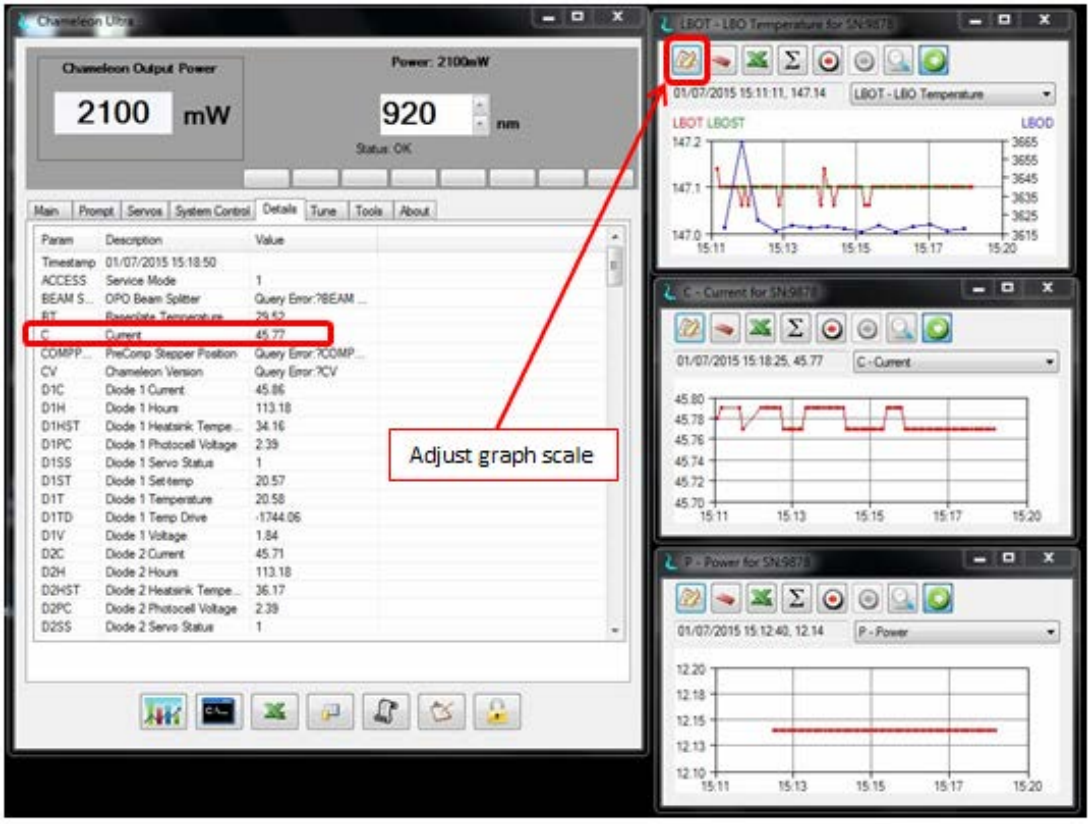
b) Tune the laser to 800nm. Select the ‘Servos’ tab and click on the ‘LBO Temperature Servo’ graph icon to open the graph. The graph will display the LBO temperature (LBOT), the LBO set temperature (LBOST) and the LBO drive (LBOD). See Fig 1b.

Fig 1b



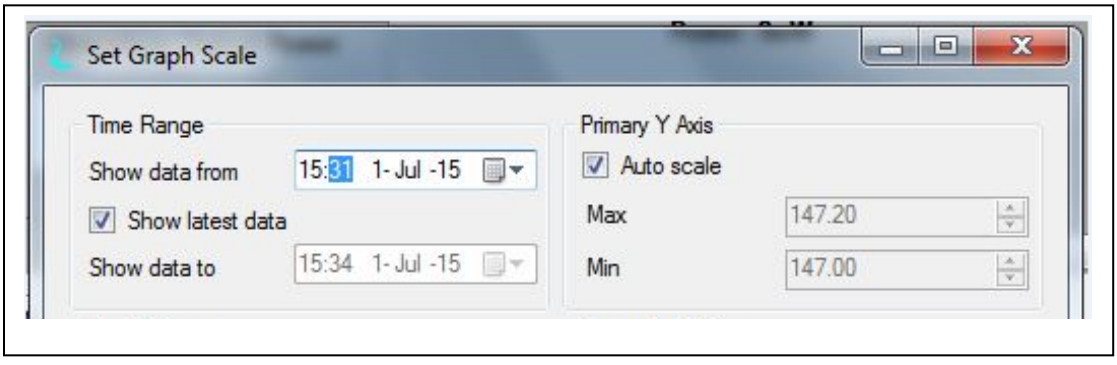
c) Select the ‘Details’ tab, double click ‘C’ to open the graph for ‘current’ and then double click ‘P’ to open the graph for ‘power’.
See Fig 1c.

Fig 1c



*Note: The time range that the data is taken from can be adjusted to suit by selecting the ‘Adjust graph scale’ tab (Fig 1c) on any of the open graphs. A new window will appear to show ‘Set Graph Scale’.
See Fig 1d.

Fig 1d



Section 2 – Optimizing the LBO set temperature

It is useful to have access to the factory EEPROM and datarun files for reference purposes during the optimization process.
See Fig 2a.

Fig 2a

		Watts(W)	m
Set Wavelength	Internal Spectrometer	Pump Power	P
680	680.4	12	
690	690.2	12.4	
700	700.7	13.1	
710	710.3	13.5	
720	720.4	14.1	
730	729.8	14.8	
740	740.2	15.3	
750	749.9	15.8	
760	760	15.7	
770	770	16	
780	779.6	16.2	
790	790	16.4	
800	799.7	16.4	
810	809.4	16.3	

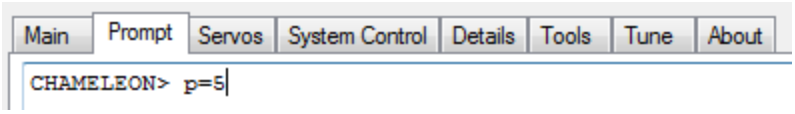
a) The laser should be fully warmed up before starting the optimization process. Ask the user to key on the laser by turning the PSU key switch from 'STANDBY' to the 'ON' position.
b) If the Verdi is found to rollover before it reaches its set output power, take a note of the value it is rolling over at. This should be clear from looking at the power graph (P). If the Verdi ramps to the set power then send 'p=18.5' and take a note of the rollover power.
c) To help find the most efficient LBOST create a table similar to the example in Fig 2b. Log any changes to the Verdi power and current after changing the LBOST.

Fig 2b

	A	B	C	D
1	LBO set temp (˚C)	P (w)	I (A)	
2	148	10.2	56	
3	147.7	14	54	
4	147.4			
5	147.1			
6	146.8			
7	146.5			

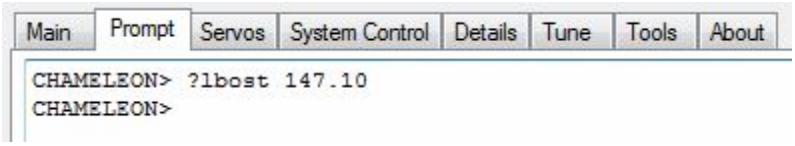
d) Before adjusting the LBOST reduce the Verdi power to a lower value e.g. Select the 'Prompt' tab on the GUI and enter RS232 command p=5 to set the Verdi power to 5W.
See Fig 2c.

Fig 2c



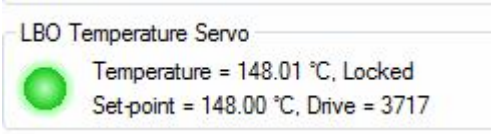
e) Enter RS232 query command '?lbost' to find the LBO set temperature value. Take a note of this number.
See Fig 2d.

Fig 2d



f) To change the LBOST enter RS232 command 'lbot=xxx.x'. Each temperature adjustment should only be altered by ±0.3˚C at any time.
g) After adjusting the LBOST wait until the LBO servo is locked and the LBOT is close to the new temperature set point value.
See Fig 2e.

Fig 2e



h) Increase the Verdi power again to find out the new rollover value e.g. enter RS232 command 'p=18.5'.

Note: The LBOST value should either be increased or decreased depending on which way increases the rollover value e.g. if you were to increase the LBOST by 0.3˚C and the rollover value reduces, then set the LBOST back to the original value and ***reduce*** the original LBOST by 0.3˚C.

i) If the rollover increases, but is still below 18.5W then make further adjustments to the LBOST using the same method as described above, until the Verdi can achieve 18.5W.
j) If 18.5W is achieved go to section 4, if it cannot be achieved, then go to section 3 to optimize the diode temperature set points.

Section 3 - Optimizing the Diode set temperatures

a) To help find the most efficient diode set temperatures (D1ST & D2ST) create a table similar to the example in Fig 3a. Log any changes to the Verdi power and current after changing D1ST & D2ST.

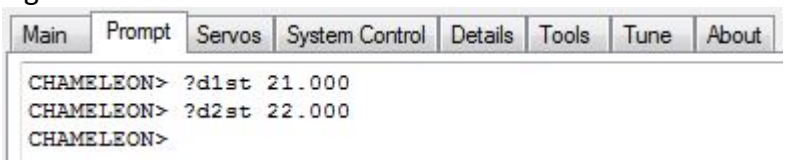
Fig 3a

	A	B	C	D	E
1	D1ST (˚C)	D2ST (˚C)	P (W)	I (A)	
2	25.04	25.71	10.2	56	
3	24.54	25.21	14	54	
4	24.04	24.71			
5	23.54	24.21			
6	23.04	23.71			
7	22.54	23.21			

The same optimization process in Section 2 should be followed again to optimize the diode set temperatures, however instead of adjusting the LBOST, both diode 1 set temperature (D1ST) and diode 2 set temperature (D2ST) should be adjusted by ±0.5˚C at a time, ***ensuring the temperature delta between the diodes remains the same with each adjustment***.

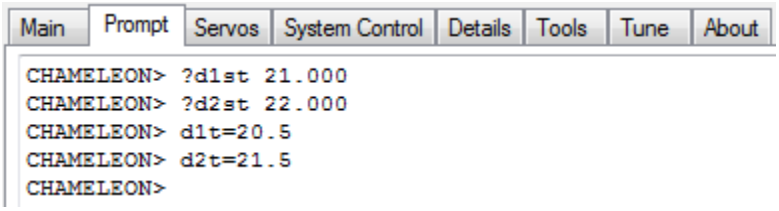
b) To query each diode set temperature enter RS232 command '?d1st' (for diode 1) and '?d2st' (for diode 2).
See Fig 3b.

Fig 3b



c) To Change the diode set temperature enter RS232 command 'd1t=xx.xx' and 'd2t=xx.xx'.
See Fig 3C.

Fig 3C



d) Once diode temperature optimization is complete, i.e. the Verdi can achieve 18.5W, the new diode temperature values will have to be converted into a wavelength value to allow the EEPROM to store it i.e. D1AW and D2AW using the following formula (where AW is Actual Wavelength and Tnew is the temperature that you want to set the diode to).
See Fig 3D.

$$\mathbf{D1AW} = \frac{(\mathbf{25-Tnew})}{\mathbf{3}} \mathbf{+808}$$

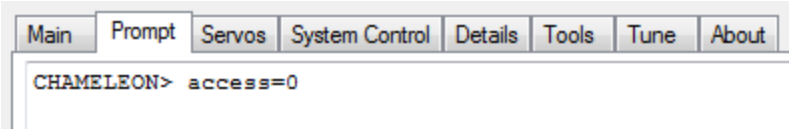
$$\mathbf{D2AW} = \frac{(\mathbf{25-Tnew})}{\mathbf{3}} \mathbf{+808}$$

e) Use the RS232 command ‘d1aw=xxx.xxxx’ and ‘d2aw=xxx.xxxx’ to enter the wavelengths generated from the equation above.

f) Go to Section 4.

Section 4 - Completing the remote diagnostic session

a) Ask the user to key the laser to standby by turning the PSU key switch from ‘ON’ to the ‘STANDBY’ position. Then power cycle the laser (switch mains off then on again).
b) Once the laser has power up again re-check that the new LBO and diode set temperatures remain. If not then re-enter the new values and begin ‘Section 4’ again.
c) Put the laser back into customer mode i.e. select the ‘Prompt’ tab on the GUI and enter RS232 command ‘access=0’.



End.

PSE: OJM