

Controlling the SPECTRA Light Engine with Olympus cellSens Software

Equipment Required

- 1. SPECTRA Light Engine [1]
- 2. National Instruments USB-6501 Digital I/O Device
- 3. Lumencor 9-channel TTL breakout cable (29-10156) [2]
- 4. Olympus cellSens software

Notes

[1] The CELESTA Light Engine can also be controlled by cellSens using the methods described in this installation note.

[2] The USB-6501 digital outputs must be connected to individual BNC female terminals for connection to the TTL breakout cable. The connection scheme is shown in Table 1.Alternatively, a breakout cable with a DB15HD connector compatible with the SPECTRA TTL port may be wired directly to the USB-6501 output ports.

	Table 1	
USB-6501	SPECTRA III	DB15HD PIN#
Digital Output	Output Channel	
P1.0	Violet	13
P1.1	Blue	12
P1.2	Cyan	3
P1.3	Teal	11
P1.4	Green	2
P1.5	Yellow	15
P1.6	Red	1
P1.7	nIR	14
# Pins 6,7,8,10 =	= Ground	

Set Up

1. Connect the USB B port of the USB-6501 to the host computer [1]. Connect the TTL port of the SPECTRA to the USB-6501 digital outputs aa described above.

2. Start Olympus cellSens and power on the SPECTRA Light Engine. Make sure that the output end of the liquid light guide or optical fiber connected to the Light Engine is safely directed into an enclosed optical path.

3. Navigate to Acquire>Devices>Device List.

4. On the Lasers/LEDs tab, set up the configuration shown in the screenshot below [2].

Configuration: Default Microscope Frame: DX50F2/50/40 manual	▼ abl × RTC: □				
Microscope Frame: DX53F2/53/43 manual	RTC:				
Camera Microscope Reflected light path	Transmitted light path	Lasers/LEDs			
Device Description	Туре	De	escription	Shutter	Intensity
Single LED 🔻	NI USB-6	501 Laser/LED #1 🔹 🕅	VI USB-6501 Laser/LED #1	1	
Single LED 🔻	NI USB-6	501 Laser/LED #2 🔹 🔹	NI USB-6501 Laser/LED #2	V	
Single LED 💌	NI USB-6	501 Laser/LED #3 🔹 🔻	NI USB-6501 Laser/LED #3	1	
Single LED 💌	NI USB-6	501 Laser/LED #4 🔹 🕅	NI USB-6501 Laser/LED #4	1	
Single LED 🔹	NI USB-6	501 Laser/LED #5 • N	NI USD-6501 Laser/LED #5	V	
Single LED -	NI USD-G	501 Laser/LED #G 🛛 🗸	VI USB 6501 Lascr/LED #6	J	
Single LED 👻	NI USB-6	501 Laser/LED #7 - N	VI USB-6501 Laser/LED #7	V	
Single LED 💌	- + NT USB-6	i501 Laser/I FD #8 🔹 🔻	VI USB-6501 Laser/LED #8	V	
			OK	Cancel	Interfaces





- 5. Navigate to Acquire>Devices>Device Settings.
- 6. Select Lasers/LEDs in the device tree and set up the configuration shown in the screenshot below.

,											
onfiguration	Single LEDs			Shutter Configuration			Intensity Control				
Default 🔹 🖻 🔁 🚰 📕	Description	Power	Wavelength	Connection	Polarity	Latency	Connection	Invert	Range	Step Size	Latenc
- 😪 Camera	NI USB-6501 Laser/LED #1	0 mW	395 nm		high-on	10 me					
Andor Zyla	NI USB-6501 Laser/LED #2	0 mW	435 nm		high=on	10 ma					
General	NI USB-6501 Laser/LED #3	0 mW	475 nm		high-on	10 ms					
Errosure	NI USB-6501 Laser/LED #4	0 mW	510 nm		high-on	10 ms					
	NI USB-6501 Laser/LED #5	0 mW	555 nm		high=on	10 ms					
- Fytra	NI USB-6501 Laser/LED #6	0 mW	575 nm		high=on	10 ms					
Timing	NI USB-6501 Laser/LED #7	0 mW	635 nm		high=on	10 ms					
Camera Adanter	NI USB-6501 Laser/LED #8	0 mW	747 nm		high=on	10 ms					
Hamamatru ORCA-Flach(0	•	,		m							
										Т	eet
Manual Nosepiece											
Lumencor SOLA SE II Shutter											
<u> </u>											
art by: Light Path 🔻											

7. Connect the Light Engine LAN port to the computer using the RJ45 ethernet cable provided. Open the Light Engine GUI in any web browser following the instructions in Lumencor Installation Note 54-10046. On the GUI Settings tab, set TTL inputs = Enabled and TTL polarity = Positive.

8. In cellSens, press the Test button on the Device Settings panel. Pressing the labeled enable buttons on the Test panel (shown on the right) will turn on the respective light output channels, registered by illumination of the source enabled indicator LED on the front panel of the Light Engine.

9. Navigate to Acquire>Devices>Device Customization.

10. For each of the eight SPECTRA light output channels, set up an observation method as shown in the screenshot below. Ensure that the status setting for the shutter component is set to "use for acquisition".

Device Customization		8 22	Test
Observation Methods Softkeys			NI USD-6501 Laser AED #1
Observation Method	Selected components		295 nm
※ X abl / 문 照 照 때		743/767	
Name: Cy7 - Group: -	🛞 NI USB-6501 #8	Use for a	VI US8-6501 Laser/LED #2
Type: Fluorescence			435 nm
Use calibration of observation method:			NI USB-6501 Laser/LED #3
Augilable components			475 nm
(1) University op of the basis Stature line for acquisition			
Constal			VI USB 6501 Laser/LED #4
Manual Nosepiece			510 nm
VI US8-6501 Laser/LED #			VI US8-6501 Laser/LED #5
VI US8-6501 Laser/LED # (() Closed			
VI US8-6501 Laser/LED 4 Opened			all and the second seco
VI US8-6501 Laser/LED #			NI USB-6501 Laser/LED #6
VI US8-6501 Laser/LED #			575 nm
VI US8-6501 Laser/LED 4			ATUSE (FOIL and FD #7
VI US8-6501 Laser/LED #			Villose 6501 Laser/LED #7
V NLUSB-GS01 Laser/LED #			635 nm
AL 030-0501 #1			VI US8-6501 Laser/LED #8
NI US8-6501 #3			747
🛞 NI USB-6501 #4			(747 m)
🛞 NI USB-6501 #5			
MI US8-6501 #6			Ciose
MI US8-6501 #7			Notes
S NT USB-6501 #8			[1] Developed and install the UOD 0501 drivers from
Eluorescence/reflected			[1] Download and install the USB-6501 drivers from
Lumencor SOLA SE II Lan			https://www.ni.com/en-us/support/downloads/drive
< <u> </u>	1		download.ni-dagmx.html#428058
			[0] The anisotropy frames and the set of the
	OK	Cancel	[2] The microscope frame setting is non-critical.





Operation

1. Select the appropriate observation method for the fluorophore of interest on the cellSens taskbar. In the example shown below, Cv7 excitation is selected.



2. To acquire image data, press Live or Snapshot.

3. Light output intensity is controlled independently by the sliders in the Light Engine GUI accessed via a LAN connection and a web browser application [1].

0	VIOLET		\$0.0% 0.0 mW	(*) (A) 250.0 mil
0	BLUE		50.0% 0.0 mW	(\$) (A) [250.1] mil
0	CYAN		50.0% 125.0 mW	(\$) (A) [250.1] mil
0	TEAL		50.0% 0.0 mW	(*) (A) 250.4 mil
0	GREEN		50.0% 0.0 mW	(\$) (A) 250.0 mil
0	YELLOW		\$0.0% 0.0 mW	\$ A 250.1 m
0	RED .		50.0% 0.0 mW	(*) (A) 250.2 mi
0	NIR		50.0% 0.0 mW	(\$) (£) 249.9 mil
ALL	0% 2% 29	% 50% 75% 100%		
Settings				Shut Down Rese

Notes

[1] Leave the ON/OFF radio buttons in the GUI in the OFF (unfilled) position when using TTL control of SPECTRA channel selection and ON/OFF status.