BLL OEM Ultra-Compact Light Source

Preliminary Product Description

ABSOLUTE MAXIMIM RATINGS WARNING

Failure to comply with the following requirements may result in the catastrophic failure of the Light Source.

Parameter	Max
DC supply voltage, V	5.6
DC supply current, A	1.5

LASER SAFETY WARNING

This Light Source emits invisible light that may have a potential hazard associated with CLASS 3R to 3B of IEC 60825-1. For further information regarding laser safety and laser classification of the Light Source please contact SUPERLUM.

1 Light Source Description

1.1 General Description

BLL Ultra-Compact Broadband Light Sources are wide spectrum SM- or PM-fiber coupled light source modules for applications requiring a reliable, powerful, stable, and low-noise SLD light source with a broad and flat spectrum and a short coherence length. A high-precision current and temperature controller powers the SLD module inside the light source. The SLD output can be modulated (ON/OFF) at the rate of up to 10 kHz. BLL Light source is designed to be mounted on a PCB or a Superlum BLL Evaluation Board[1]. An optional BLL Evaluation Board allows for a quick and easy BLL light Source setup and testing.

BLL Light Source allows various options to control the optical output: by the pushbutton on the case, by logic signals via the 12-pin connector, or from a USB interface via a Superlum BLL Evaluation Board[1] .

Superlum OEM light sources are designed and intended for integration into Customer equipment and must be considered components.

Four versions of BLL OEM light source are available for ordering:

- Constant current (ACC) SLD driving
- Constant current SLD driving with external modulation option (ACC-M)
- Constant power (APC) SLD driving
- Constant power SLD driving with external modulation option (APC-M)

The version of the BLL must be specified when placing an order.

1.2 Optical Performance

The optical design is based on SM or PM optical fiber. Non-isolated Light Source can tolerate no more than -30dB feedback.
The optical output can be a FC/APC or SC/APC terminated fiber pigtail in a 0.9 mm tube.

NOTE – The ultra-compact BLL is customizable. Please contact sales@superlum.ie for more information on the optical performance and other spec options available with all our product line.

1.3 Package Contents

This Light Source is supplied with the following accessories as standard (these parts are to be found in the shipping box which should be kept and carefully stored):

- One 12-pin connector header;
- One USB card containing Superlum Companion Software and a copy of this Manual;
- Acceptance test report (ATR).

BLL Evaluation Board[1] comes with a USB cable and a power supply.

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[1] Sold separately. Detailed description is provided in Appendix B of this Document.

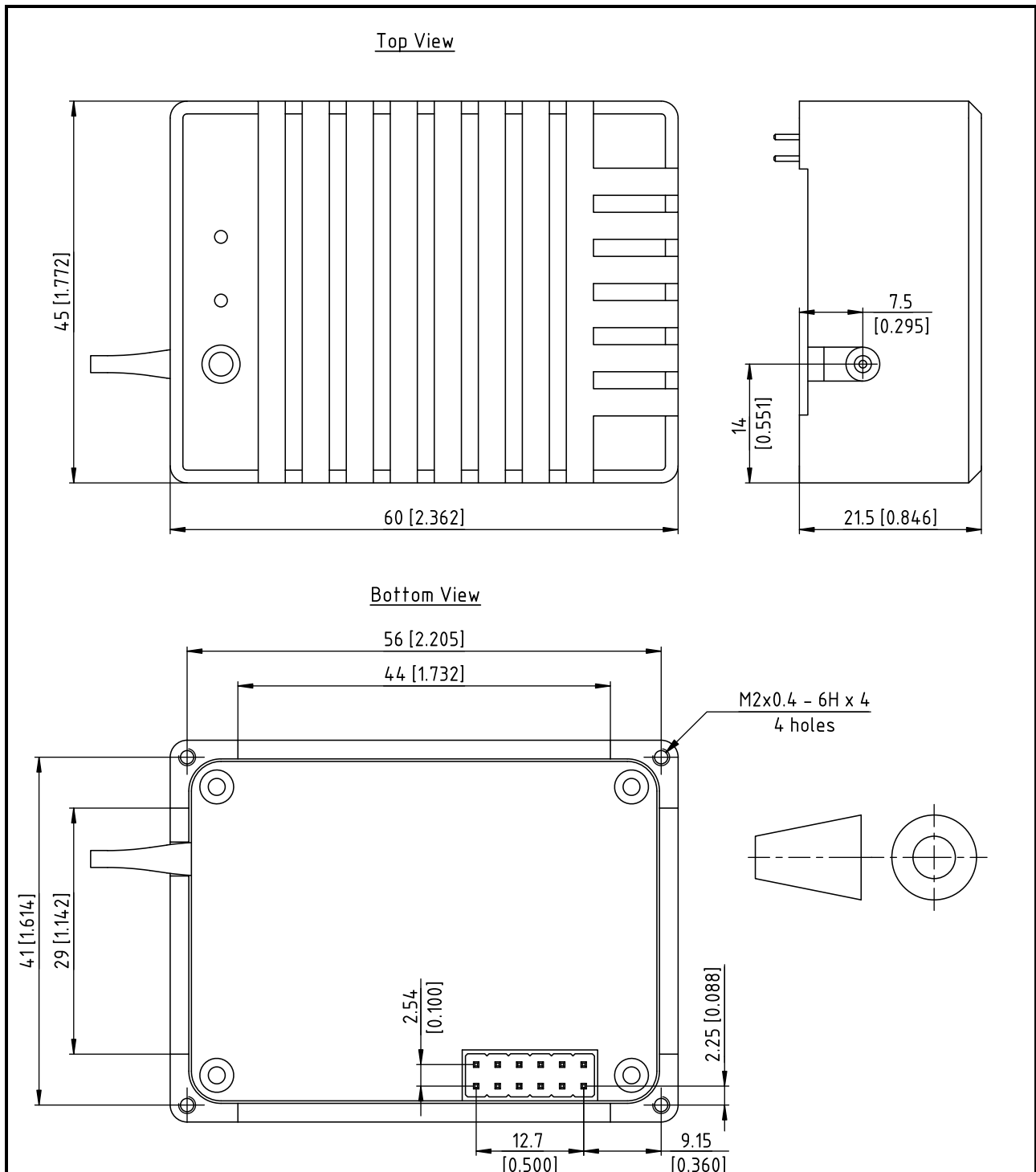## 1.4 Outlines and Dimensions

Top View

Bottom View

Figure 1. Drawings of Light Source. Dimensions are in millimeters [inches]
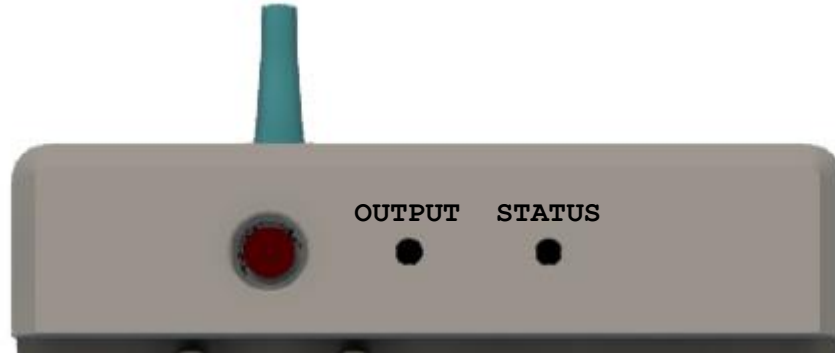
1.5 Control LEDs

Figure 2**.** LED indicators of the Light Source.

There are two LEDs on the front panel. These LEDs are a visual indication of the device status as described in the Table 1 below.

Table 1. Statuses of control LEDs

LED Name	LED State	System status
"OUTPUT"	No light	The optical output is off.
	Flickering green	The optical output is starting (soft start).
	Green	The optical output is on.
	Yellow	SLD or PD current limit reached (SLD degradation or optical feedback). Time to service.
"STATUS"	No light	No power. No active SLDs.
	Flickering green	Temperature stabilization is in process.
	Green	SLD temperature is stabilized at the pre-set level. The optical output can be switched on. No errors detected.
	Flickering red	The optical output and all controls are disabled once the interlock has been actuated (correspondent terminals on the REMOTE port are open circuited). Interlock is only operable if the correspondent option is computer activated
	Red	Common Error. Failure of the temperature controller.

2 Technical Specification
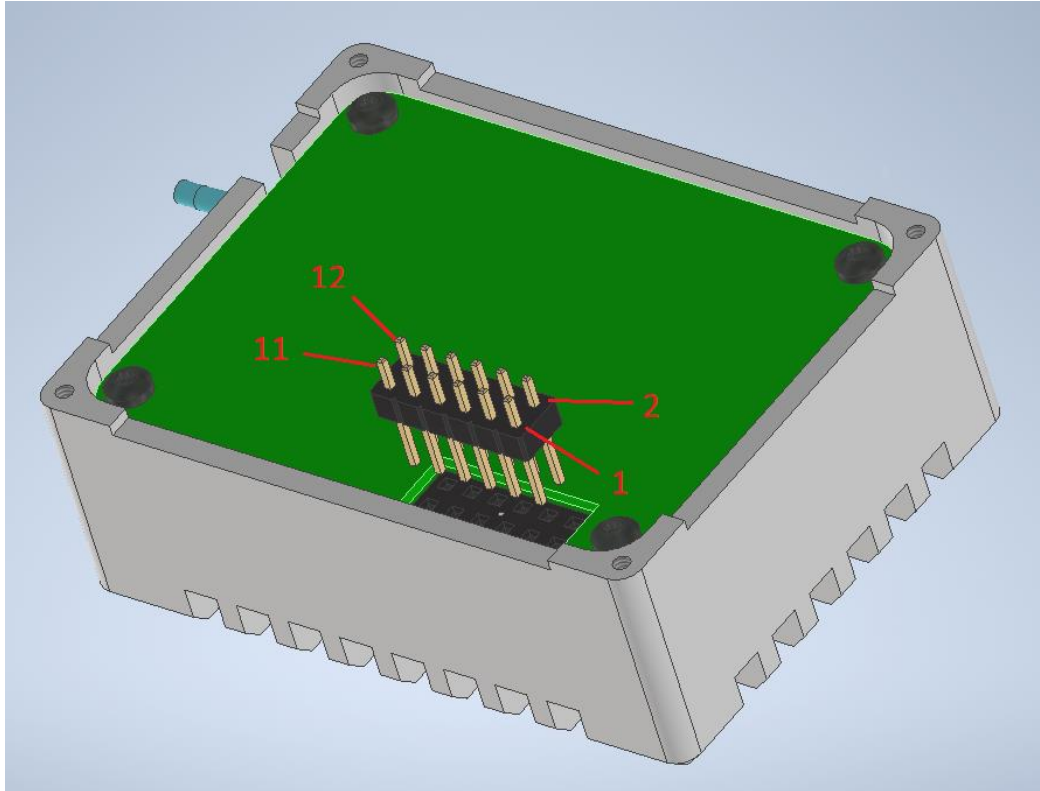
2.1 Electrical Connections

Figure 3**.** Light Source electrical pin configuration

Table 2. Light Source electrical pin description.

Pin Number	Pin Name	Pin Type	Pin Description
1, 2	VCC	Power Input	Input voltage supply (5 VDC +/- 5%)
3, 4	GND		Ground
5	RMD	Input	Modulation input. Active high.
6	RON	Input	ON/OFF optical output power. Active high.
7	REN	Input	ENABLE/DISABLE optical output. Optical output disabled if this pin not connected or tied to ground. Apply VCC to enable optical output.
8	RDY	Output	Readiness status. Low state indicates that the device is ready to accept RON signal.
9	OUT	Output	Output status. Low state indicates that the optical output is ON.
10	SRV	Output	Service status. Low state indicates that the service required.
11	RXD	Input	UART data input
12	TXD	Output	UART data output

All outputs are open – collector type. An external resistor must be connected to VCC. Recommended resistor value is 4.7 KOhm.

2.2 General Specification

Table 3. General specification.

Parameter	Condition	Min	Typ	Max	Unit
Storage temperature		−20	–	+70	°C
Operating temperature		+5	–	+45	°C
Humidity, non-condensing		–	–	90	% RH
Weight	With no shipping package		100		gram
DC supply voltage		4.75	5.0	5.25	V
DC supply current [1]		–	–	1.5	A

(1) The power supply requirements indicated in Table 2.2 above are critical for the correct operation of the light source and must be strictly complied with. The power supply should ideally be capable of supplying up to 1.5 A current, however a less powerful unit may be used but it will limit the operating temperature range.

2.3 Fiber and Optical Connection Specification

Table 5

	Type	Comments
Fiber type	SM/PM	Corning HI780 fiber for 750-1000nm spectral range; Corning SMF-28 fiber for 1.20-1.65um spectral range Corning PM850 fiber for 750-1000 nm spectral range (PM version). Other fiber types available upon request.
Connector type	FC/APC	FC/APC terminated fiber pigtail in a 0.9 mm jacket. Other connectors available upon request.

2.4 Other Electro-Optical Characteristics

Table 6

Parameter	Condition	Min	Typ	Max	Unit
Temperature dependent optical drift in the specified operating temperature range	Optically not isolated Light Source	–	150	250	ppm/°C
Relative Intensity Noise (RIN)	10 kHz…2 MHz	–	−135	−125	dB/Hz
Long-term optical power stability ???	8 h after 60 min warming up	–	2 500	10 000	ppm
"Ready-to-work" time	From the moment of DC power application	–	–	7	s
Cold start settling time (system warm-up) ???		20 [1]	30	90 [2]	min
Rise time of optical signal		30	50	100	ms
Fall time of optical signal		1	–	3	µs

(1) at +25 °C;
(2) at high and low extremes of the operating temperature range. Надо что-то другое. Или не надо вообще.

3 General Information

3.1 Mounting

Temperature control is an essential factor when considering where and how you will integrate this light source into your application. Please contact Superlum should you have any queries about the BLL thermal management during installation and operation. A forced air circulation system around the enclosure is strongly recommended. To ensure the maximum effective heat dissipation, the Light Source may be mounted to an appropriate heatsink in any spatial orientation with 25mm of free space around the sides and cover to allow air circulation. The Light source should be anchored to a flat plate heatsink large enough to accommodate the light source base's entire footprint *(see section 1.4; Figure 1. Drawing of Light Source)* using the four (4) anchoring holes.

3.2 Mounting on PCB

BLL light source is designed to be mounted on a PCB. Recommended PCB drilling outline is shown below:
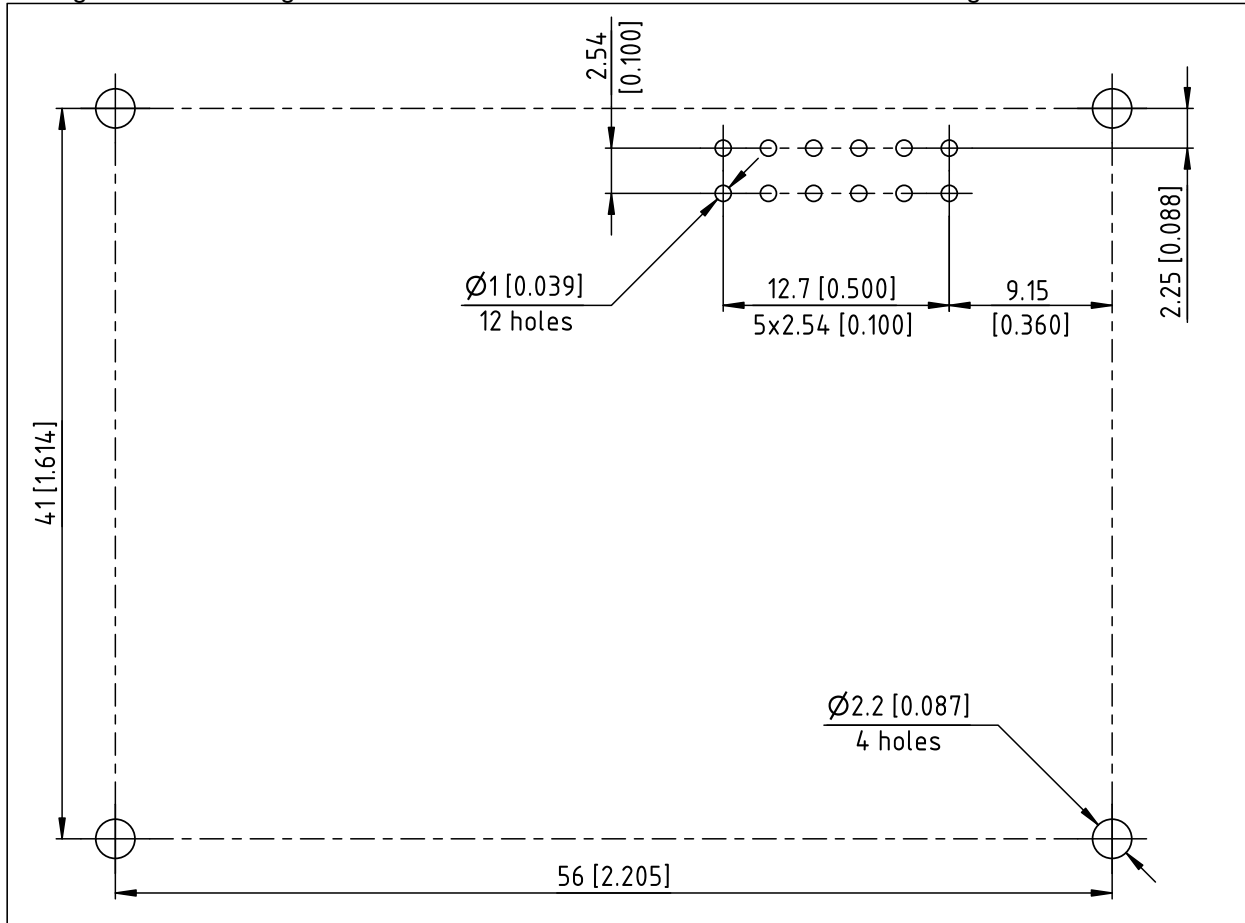

Figure 4. Recommended PCB drilling layout. Dimensions are in millimeters [inches].
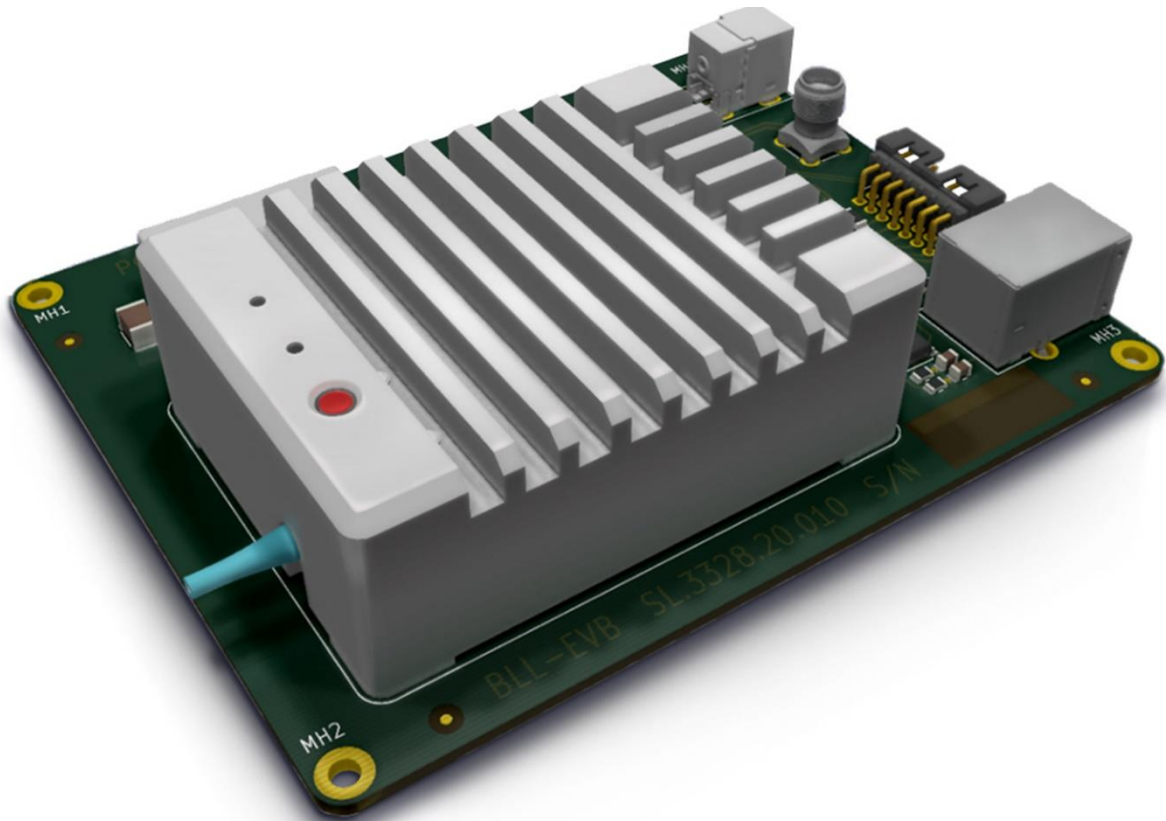
3.3 Mounting on Superlum Evaluation Board

Figure 5**.** BLL Light Source mounted on a BLL evaluation Board.

BLL Light Source can be mounted on a Superlum BLL Evaluation Board to enable external USB control. Refer to the BLL companion software for remote control via computer using the USB port. The computer interface fitted to this device is a non-standard USB interface. It provides a virtual COM port for remote control via USB connection.

A summary of the most relevant remote-control features (also those available with SUPERLUM's companion software) are given in Table 3 below:

Table 3. Remote control features via BLL Connectivity Board.

USB (virtual COM port)
- ON/OFF control of the optical output;
- SLD module ON/OFF control;
- Monitoring of relevant driving parameters of SLD module;
- Self-test option – remote diagnostics feature;
- Controlling of optical performance.

Detailed description of the Evaluation Board is provided in Appendix B of this Document.

3.3 Safety Considerations

Superlum OEM light source modules are sold as components. Therefore, they are not required to conform to European or U.S. safety regulations and rules in force in any other country/destination. The buyer/user's responsibility is to design and certify any equipment incorporating any OEM source of Superlum to meet all local safety regulations before sale to the public. The texts of these regulations are available from the countries' respective governing bodies where the equipment is to be sold.

All Superlum OEM light source modules except the models with emission wavelength below 690 nm emit invisible radiation. They have a potential laser safety hazard classified as CLASS 3R or 3B under IEC 60825-1:2014. Superlum OEM light source modules may not have ALL the required laser safety features in terms of IEC 60825-1 like remote interlock, key-operated master control, warning signals, and labels. Superlum OEM light source modules are designed for integration into other equipment. It is the Buyer/User's responsibility to develop and certify any equipment incorporating any OEM source of Superlum to meet all local safety regulations and applicable standards.

The Light Source is designed for integration into an OEM application and, as such, is outside the scope of laser safety standards. The BLL Light Source is not supplied with laser safety devices, e.g., key-operated master control.

Please contact Superlum for more details about laser safety and other safety issues of each light source module P/N.

APPENDIX A
BLL UART Command Protocol

UART configuration:

Baud Rate = 57600;
Start Bits = 1;
Stop Bits = 1;
Parity = None;
Flow Control = None.

1   SYSTEM COMMANDS

1.1   Read Light Source type, firmware version and serial number

Request: [I] [CR] [LF]
Acknowledge: [I] [:] [TYPE] [:] [VH] [VL] [:] [SN] [CR] [LF]
Error message: [!] [E] [CR] – common error message.

[CR] [LF] – line termination sequence ([CR] – ASCII13, [LF] – ASCII10)

[TYPE] – Light Source type, five ASCII printable chars:
            "BLC-S" – one channel Light Source;
            "BLC-D" – two channels Light Source;
            "BLC-T" – three channels Light Source;
            "BLC-E" – one channel Light Source with electronic output power control function.
[VH] – Major part of firmware version [0…9], one ASCII chars;
[VL] – Minor part of firmware version [0…9], one ASCII chars;
[SN] – Serial number, six ASCII printable chars.

1.2   Set Light Source operation mode. Read current mode.

Request: [M] [CMD] [CR] [LF]
Acknowledge: [M] [MODE] [CR] [LF]
Error message: [!] [E] [CR] [LF] – common error message.

[CMD]	DESCRIPTION
[?]	Read current mode
[L]	Set LOCAL mode
[U]	Set UART CTRL mode

[MODE]	DESCRIPTION
[L]	Device operated in LOCAL mode
[U]	Device operated in UART CTRL mode
[E]	FATAL ERROR mode

2   UART CTRL MODE COMMANDS [U]

2.1   Switch SLD ON/OFF. Read Channel status data

Request: [U] [C] [CH] [CR] [LF]
Acknowledge: [U] [C] [IL] [ST1] [CR]
Error message: [!] [E] [CR] [LF] – common error message;
                    [!] [M] [CR] [LF] – wrong mode set message.

[CH]	DESCRIPTION
[?]	Read CH status data
[1]	Switch SLD ON/OFF
[9]	Switch SLD ON/OFF

[IL] – Remote interlock data [0] or [1]:
           [0] – output disabled;
           [1] – output enabled.
[ST1] – Channel 1 status, [00…FF], two ASCII chars in hexadecimal code. See table below for signal
           identification.

SIGNAL	BIT	DESCRIPTION
OME	0	'1' – Optical module enabled '0' – Optical module disabled
TON	1	'1' – TEC ON; '0' – TEC OFF
TGD	2	'1' – Optical module temperature stabilized '0' – Optical module temperature not stabilized
TER	3	'1' – TEC (Thermistor) error
SMD	4	'1' – SLD operated in ACC mode '0' – SLD operated in APC mode
SON	5	'1' – SLD ON; '0' – SLD OFF
SLM	6	'1' – SLD current limit reached
SER	7	'1' – SLD error

2.2 Switch control

Request: [U] [S] [CMD] [CR] [LF]
Acknowledge: [U] [S] [SWDATA] [CR] [LF]
Error message: [!] [E] [CR] [LF] – common error message;
                    [!] [M] [CR] [LF] – wrong mode set message.

[CMD]	DESCRIPTION
[?]	Read current Switch Data
[1]	Switch Channel #1 (CH1)
[5]	Enabling / Disabling Interlock
[6]	Enabling / Disabling REMOTE port
[7]	Enabling / Disabling External Modulation
[S]	Store current Switch Data to EEPROM

[SWDATA] – Switch status, [00…FF], two ASCII chars in hexadecimal code. See table below for signal
               identification

[SWDATA]	DESCRIPTION
Bit#0	'1' – Channel #1 (CH1) enabled '0' – Channel #1 (CH1) disabled
Bit#1	Reserved, reads as null
Bit#2	Reserved, reads as null
Bit#3	Reserved, reads as null
Bit#4	'1' – Interlock enabled '0' – Interlock disabled
Bit#5	'1' – REMOTE port enabled '0' – REMOTE port disabled
Bit#6	'1' – External Modulation enabled '0' – External Modulation disabled
Bit#7	'1' – Output Power Monitor enabled '0' – Output Power Monitor disabled

2.3 Measure optical module parameter (read data from ADC)

Request: [U] [M] [CH] [PN] [CR] [LF]
Acknowledge: [U] [M] [CH] [PN] [ADATA] [CR] [LF]
Error message: [!] [E] [CR] [LF] – common error message;
                        [!] [M] [CR] [LF] – wrong mode set message.

[CH] – Channel number [1], one ASCII character;
[PN] – Parameter number [1…8], one ASCII character;
[ADATA] – Parameter value [0000…FFFF], four ASCII characters in hexadecimal code.

[PN]	DESCRIPTION	ADATA RANGE
1	Real TEC current	[0000] = 0,00A [00FF] = +2,55A [0101] = -0,01A [01FF] = -2,55A
2	SLD current (maximum current) set value	[0000]=0,00 mA [FFFE]=655,34mA
3	Optical module photo-diode current (HP) set value	[0000]=0,0µA [FFFE]=6553,4µA
4	Optical module photo-diode current (LP) set value	[0000]=0,0µA [FFFE]=6553,4µA
5	Real Optical module temperature value	[0000]=0Ω [FFFE]=65534Ω
6	Real SLD current value	[0000]=0,00 mA [FFFE]=655,34mA
7	Real PD current value	[0000]=0,0µA [FFFE]=6553,4µA
8	Optical module temperature set point value	[0000]=0Ω [FFFE]=65534Ω

Note - ADATA overload string is [FFFF].

2.4 Read optical module parameter

Request: [U] [P] [MN] [PN] [CR] [LF]
Acknowledge: [U] [P] [MN] [PN] [DATA] [CR] [LF]
Error message: [!] [E] [CR] [LF] – common error message;
                [!] [M] [CR] [LF] – wrong mode set message.

[MN] – Optical module number, [1] (One ASCII character);
[PN] – Parameter number, [0…9] (One ASCII character);
[DATA] – Parameter data see table below.

[PN]	Description	DATA Range	Comments
0	Optical module serial number	[XXXXXX]	Six ASCII printable characters
1	Optical module operation mode	[0] or [1], one ASCII char	[0] – APC mode [1] – ACC mode
2	Optical module temperature set point value	[0000…FFFE], four ASCII chars	[0000] = 0 ohm [FFFF] = 65534 ohm
3	Optical module maximum current value	[0000…270F], four ASCII chars	[0000] = 0,0 mA [270F] = 999,9 mA
4	Optical module current value	[0000…270F], four ASCII chars	[0000] = 0,0 mA [270F] = 999,9 mA
5	Optical module photo-diode current value (HP)	[0000…270F], four ASCII chars	[0000] = 0 µA [270F] = 9999 µA
6	Optical module photo-diode current value (LP)	[0000…270F], four ASCII chars	[0000] = 0 µA [270F] = 9999 µA
7	Optical module photo-diode current maximum value	[0000…270F], four ASCII chars	[0000] = 0 µA [270F] = 9999 µA
9	Optical module operating time	[00000000]-[FFFFFFFF], Eight ASCII chars	00000000 – 0 s; 0000000A – 10 s; ….

2.5 Read optical module parameter (factory data)

Request: [U] [F] [MN] [PN] [CR] [LF]
Acknowledge: [U] [F] [MN] [PN] [DATA] [CR] [LF]
Error message: [!] [E] [CR] [LF] – common error message;
                [!] [M] [CR] [LF] – wrong mode set message.

[MN] – Optical module number, [1] (One ASCII character);
[PN] – Parameter number, [0…8] (One ASCII character);
[DATA] – Parameter data. See table 2.4 above for details.

2.6 Adjust optical module parameter

Request: [U] [J] [MN] [PN] [DATA][CR] [LF]
Acknowledge: [U] [J] [MN] [PN] [DATA] [CR] [LF]
Error message: [!] [E] [CR] [LF] – common error message;
                    [!] [M] [CR] [LF] – wrong mode set message.

[MN] – Optical module number, [1] (One ASCII character);
[PN] – Parameter number, [4] or [5] (One ASCII character);
[DATA] – Parameter data. See table 2.4 above for details.

2.7 Store adjusted optical module parameters in EEPROM

Request: [U] [E] [CR] [LF]
Acknowledge: [U] [E] [Y] [CR] [LF]
Error message: [!] [E] [CR] [LF] – common error message;
                    [!] [M] [CR] [LF] – wrong mode set message.

[Y] – Result of data storing:
                '1' – all right;
                '0' – data storing error.

2.8 Read temperature and output power

Request: [U] [T] [CR] [LF]
Acknowledge: [U] [T] [TV] [PV] [CR] [LF]
Error message: [!] [E] [CR] [LF] – common error message;
                    [!] [M] [CR] [LF] – wrong mode set message.

[TV] – Temperature value [00…FF], two ASCII chars in hexadecimal code in two's complement form:
                [7F] = +127 ºC;
                [00] = 0 ºC;
                [FF] = -1 ºC;
                [81] = -127 ºC;

                [80] - no temperature sensor installed or temperature sensor error.

[PV] – Output power value [000…FFF], three ASCII chars in hexadecimal code.
                [000] = 0 mW;
   [FFF] = 409,5 mW.

APPENDIX B

BLL Evaluation Board Description

BLL Light Source can be mounted on a Superlum BLL Evaluation Board to enable external USB control. Refer to the BLL companion software for remote control via computer using the USB port. The computer interface fitted to this device is a non-standard USB interface. It provides a virtual COM port for remote control via USB connection.

A summary of the most relevant remote-control features (also those available with SUPERLUM's companion software):

- ON/OFF control of the optical output;
- SLD module ON/OFF control;
- Monitoring of relevant driving parameters of SLD module;
- Self-test option – remote diagnostics feature;
- Optical performance controlling.

BLL Evaluation Board has the following interfaces:
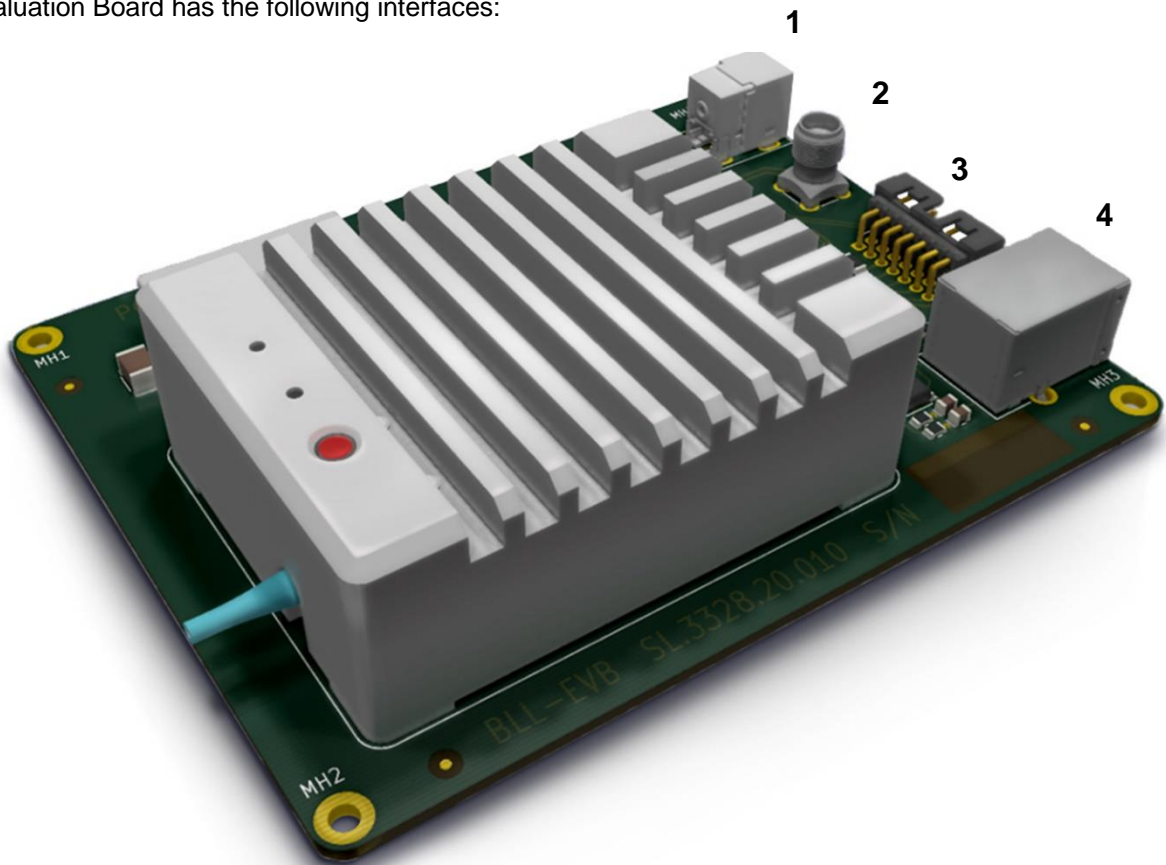
BLL Evaluation Board Interfaces:			
1	Power	IN	12V DC power supply input
2	Modulation	IN	SMA external modulation input
3	Remote Port	IN/OUT	14 pin Remote Port for Remote Control
4	USB	IN/OUT	USB port type B for Computer Control

Remote port description:

REMOTE port:			
1, 2		NC	Not Connected
3	EXTERNAL MODULATION GND		External modulation signal common wire
4	EXTERNAL MODULATION	IN	External modulation signal
5	INTERNAL +5V (200Ohm)	OUT	
6	INTERLOCK CONTROL	IN	Interlock is actuated when the control terminals are open circuited – optical output and controls are disabled in this case. 10mA (max) current. To de-actuate the earlier actuated interlock, device power resetting is required. Interlock is operable, only if the correspondent option is activated in remote control software
7	OUTPUT ON/OFF (N)	IN	Allows switching the optical output. Connect this pin to any LOGIC GND pin to switching optical output ON.
8	OUTPUT ON/OFF (P)	IN	Allows switching the optical output. Apply +5VDC voltage from external power supply between this pin and any LOGIC GND pin to switching optical output ON
9	OUTPUT STATUS	OUT	Open collector. Goes to low impedance state in case of the optical output is ON. Recommended to load externally by ballast resistor of >=10kΩ
11	READINESS STATUS	OUT	Open collector. Goes to low impedance state in case of the optical output is ON. Recommended to load externally by ballast resistor of >=10kΩ
13	SERVICE STATUS	OUT	Open collector. Goes to low impedance state in case of service is required. Recommended to load externally by ballast resistor of >=10kΩ
10, 12, 14	LOGIC GND		Logic common wire

NOTE – To enable the controls of the REMOTE port, prior activation is required via USB / Ethernet interface (with use of SUPERLUM's companion software). The interlock is the only control option, computer activated separately from other controls of the REMOTE port.

Activation of REMOTE controls (except the interlock control) disables a manual ON/OFF control of the optical output from the front device panel.

Controlling via REMOTE port (except the interlock control) is possible only if the Light Source is not computer controlled in parallel.
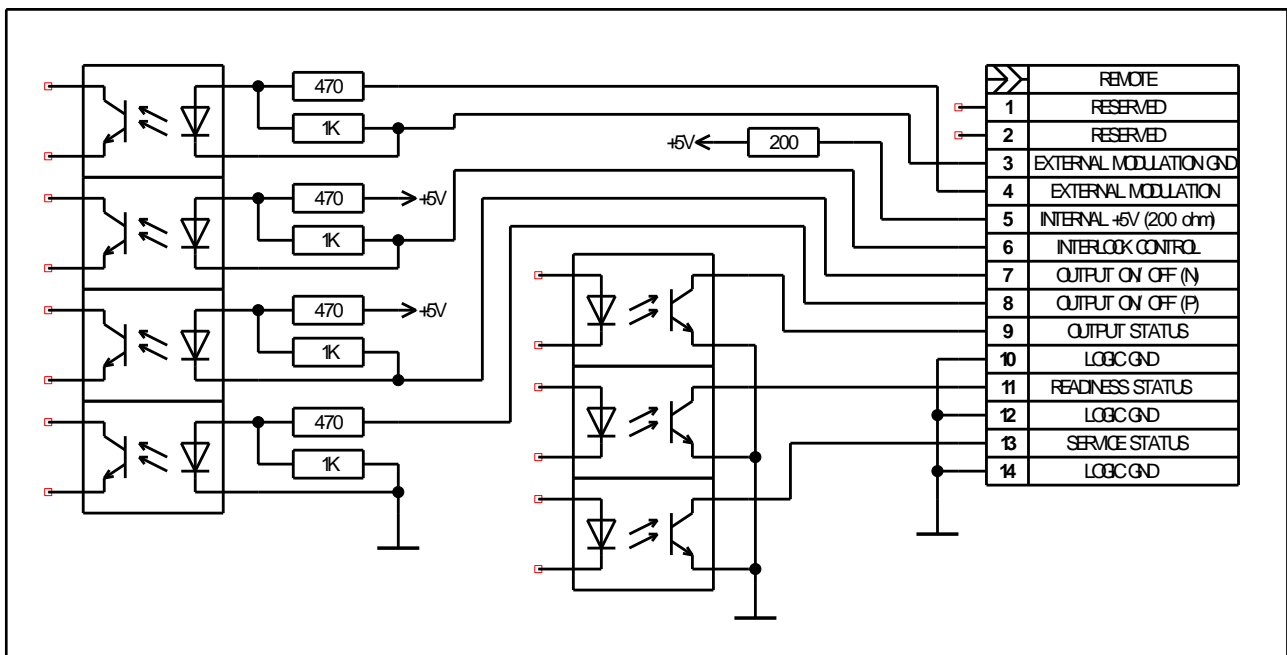

Figure B.**1** The electrical circuit of REMOTE port

Controlling the BLL Light Source via Remote port

This section concerns to all control options available with the REMOTE port, except the interlock control. The latter is activated and controlled separately from other controls of the REMOTE port.

Connect the Light Source to a computer via USB.

Power on the Light Source.

Run companion software. Establish communication with the Light Source.

Check the "Remote control" box in the "*Configuration*" area of the software display, and click "Save" display button to apply changes. It activates the option of controlling via the REMOTE port.

Analog control via the REMOTE port will be user-available once the computer session has been interrupted (click "REMOTE" display button to toggle computer control on and off).

Control the Light Source by applying control signals to the terminals of the REMOTE port. Possible example is shown on Figure B2.
Uncheck the "Remote Control" box of the "*Configuration*" area of the software display to disable the REMOTE port, and to return to manual and computer controlling of the Light Source.
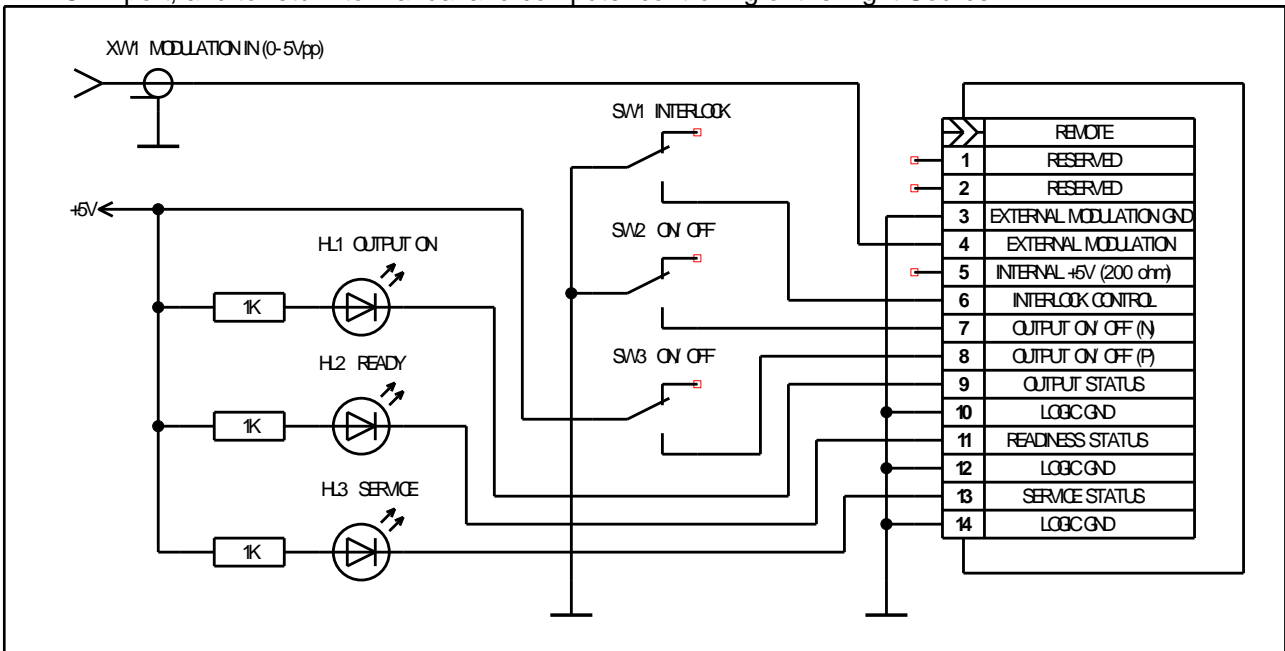

Figure. B.2 Example of basic controlling of the Light Source via REMOTE port

Establishing Computer Communication with Evaluation Board

Manual control of the Light Source from the front device panel becomes disabled once the Light Source has established computer communication

Minimum System Requirements for SUPERLUM's Companion Software for remote control of the Light Source:

> **Operating system:** Windows 95, 95 OSR2, 98 or 98 SE, Windows ME, Windows NT Workstation 4.0 Service Pack 3, Windows 2000 Professional, Windows XP, Windows Vista, Windows 7.
> **Memory:** 32 megabytes (MB) for Windows 9x and ME, 64 MB for Windows NT, 128 MB for Windows 2000 and XP, 1 gigabyte (GB) (32-bit) or 2 GB (64-bit) for Windows Vista and Windows 7.
> **Processor:** 100-megahertz (MHz) or faster processor for Windows 9x and ME, 300-MHz or faster processor for Windows 2000 and XP, 1-gigahertz (GHz) or faster 32-bit (x86) or 64-bit (x64) processor for Windows Vista and Windows 7.
> **Hard disk space:** 5 MB of free hard disk space (not including disc space required for associated USB drivers – see below).

Communication Interface

This Light Source incorporates an embedded Serial-to-USB converter that allows internal serial interface commands to be transmitted over USB. The converter comes with device drivers that create a virtual COM port on the computer to communicate with the Light Source.

The virtual COM port (VCP) drivers for the Serial-to-USB converter can be found on the FTDI web site:
http://www.ftdichip.com/Drivers/VCP.htm

Computer Control of BLL Light Source with SUPERLUM's Companion Software and BLL Evaluation Board

Software allows basic remote computer controlling of the Light Source via USB port.
You can create your own control software using the provided command protocol (see APPENDIX A). However, it is recommended that in the first instance to use SUPERLUM's Companion Software.

## Brief description of software operation

Run the software. When starting the software for the first time, the following window for selecting of COM port # will appear.
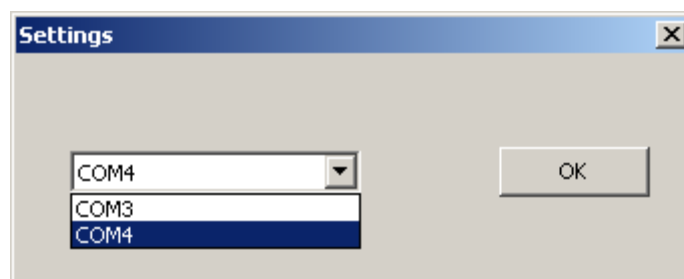
If the drop-down list for setting COM port number is not available, or if this list does not contain the COM port number the Light Source is connected to, it may indicate that there is either no DC power applied to the Light Source, or the Light Source is not connected to the computer.

Select COM port # to which the Light Source is connected. The next window will then appear, as shown below. You can change COM port # when required by clicking on the "Connection" display button.
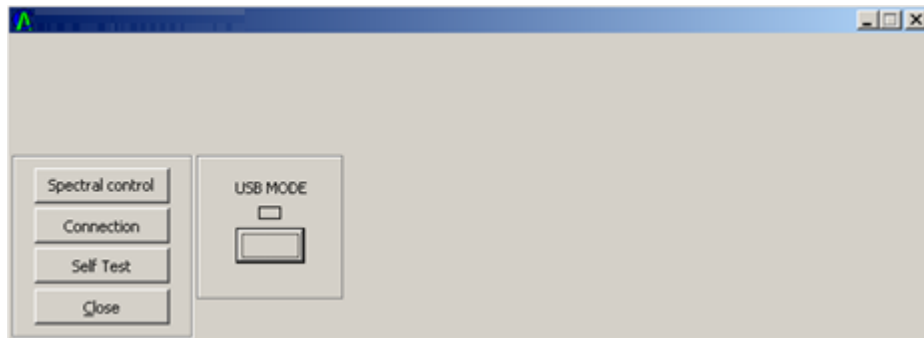
The selected COM port # will be stored. All future times of connecting the Light Source to the same computer and to the same computer communication port, the initial "Settings" window will no more appear at starting the software.

Once the "USB MODE" button has been clicked on the software display, the Light Source turns to remote operation, and the following window appears (indicator turns from blank to green). Manual control of the Light Source from the front device panel becomes disabled once the Light Source has established computer communication.
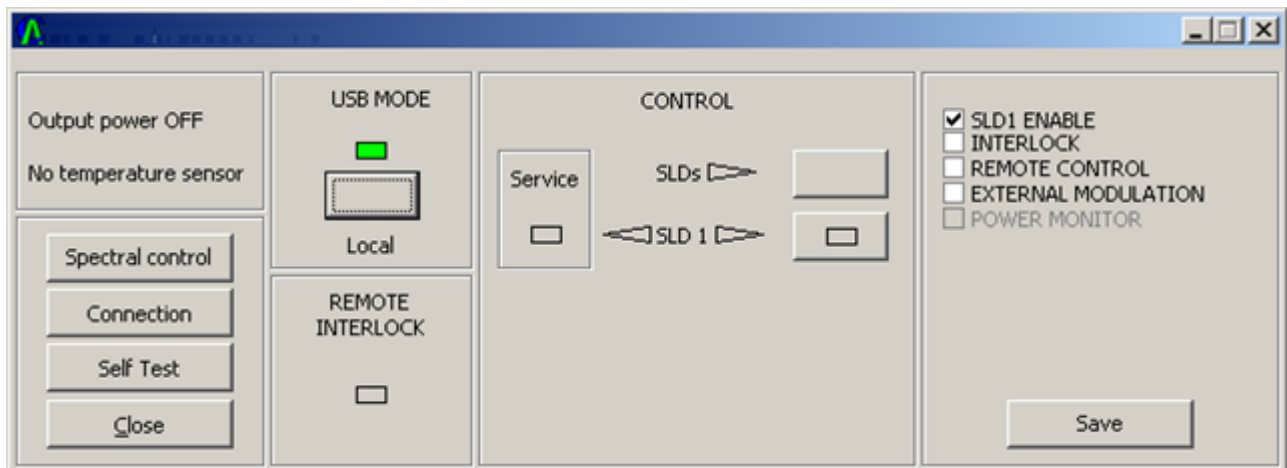
Display indicators - "SLD" and "Service" in the "*SLD Operation*" area - show actual statuses of the SLD- channel (TEC and SLD statuses). Optical output can be toggled on and off with the "SLD enable" display button –SLD channel, which are selected (activated) in the "*Configuration*" area, will only be toggled.

"Self Test" option is used for internal self-testing of the Light Source. It is initiated by clicking on the "**Self Test**" display button in the "*Options*" area. This procedure may take a few minutes after being initiated. Upon completion, the program will automatically generate a test file, which should be e-mailed to SUPERLUM for further processing and verification of actual device statuses. You can add your comments before saving and e-mailing the generated self-test file.

The **"***Configuration***"** area of the software display allows the following control features:

- **Activate / deactivate SLD- channel for on/off toggling.** Only those SLD channels, which are selected / checked in the **"***Configuration***"** area, will be triggered ON and OFF remotely ("SLD enable" button of the companion software, and through the REMOTE port if activated) and manually (front panel pushbutton). By default (being factory preset) all SLD channels involved are pre-selected in the "*Configuration*" area, i.e. are ready for controlling.

- **Activate / deactivate the remote interlock.** The interlock is actuated – the optical output and all controls become disabled, and the correspondent indicators ("Remote" LED indicator on the device panel, and "REMOTE INTERLOCK" software display indicator) lit red – when the correspondent control terminals on the REMOTE port are open circuited (see Sec. 2.1 for more details). To de-actuate the earlier actuated interlock, device power reset is required.

- **Activate /deactivate analog controls of the REMOTE** port (does not apply to the remote interlock control, which is computer activated separately). Manual control of the Light Source remains disabled when analog controls of the REMOTE port are activated.

- **Activate / deactivate the external modulation input.**

Any changes to the **"***Configuration***"** area are possible only when the optical output is switched off. Changes are applied immediately once correspondent boxes are ticked in the "*Configuration*" area.

To save changes introduced to the **"***Configuration***"** area, the **"Save"** display button in the "*Configuration*" area must be clicked. In this case the introduced changes are stored even after device power re-setting. Otherwise, the changes introduced are in place only during the current work session.

Yellow indication of "**SLD**" display indicators in the "*SLD Operation*" area show that the correspondent channel(s) have not reached readiness. When SLD is fully ready for operation, the correspondent indicator turns to blank.

"Spectral control" option is used for fine adjustment of Light Source output performance.
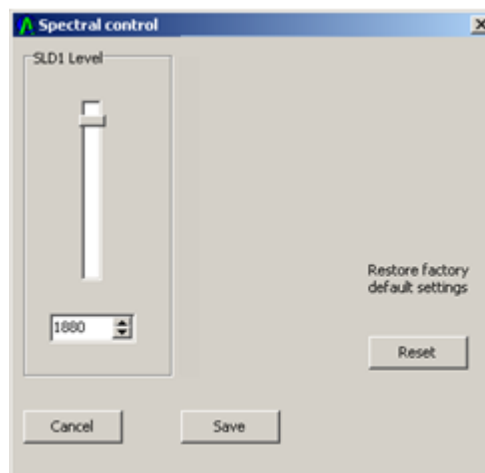
SLD channel level bar. These bars allow you to control the output level of the SLDs. This can be varied between 0 (no output) to a maximum allowed value. By default, this bar is set so the intensities of the spectral peaks forming the output of the Light Source are equalized.

SLD channel level value. These texts fields show you the SLD output level in arbitrary units. For a precise level control, the User can also type in a value or control it with the up arrow and down arrow buttons. These arbitrary units were pre-calibrated at Superlum and the value is unique for each SLD. The User can expect a near linear dependence between the value in arbitrary units and the actual output power. The maximum level value in arbitrary units is unique for each SLD and is hard-preset by Superlum.

Reset button. Resets the SLD output levels to factory settings.

Cancel button. Discard changes made in the spectral control menu.

Save button. Save the changes made in the spectral control menu. The settings will be stored in the Light Source memory.

*By changing the SLD output level **both** the spectral shape and the intensity of SLD output are changed. Be very careful when adjusting the output levels of the SLDs.*