SUPERLUM

PRODUCT DESCRIPTION AND QUICK START GUIDE

BLMS mini Light Source

BLMS mini. Description and Quick Start Guide

THANK YOU FOR CHOOSING A SUPERLUM PRODUCT!
PLEASE READ THIS DOCUMENT CAREFULLY BEFORE USING THE BLMS mini LIGHT SOURCE. IF YOU HAVE ANY QUESTIONS REGARDING THIS DOCUMENT PLEASE CONTACT SUPERLUM SUPPORT.

DESCRIPTION

BLMS mini is a compact, reliable and broadband OEM light source with fiber output. It offers stable, low noise wide spectrum output with a low temporal coherence. Available for Superlum SLDs in 670 – 1630 nm spectral range. BLMS mini incorporates SLD module, high precision current & temperature controller and optional optical isolator. Remote access is available via USB or DB-25M connectors.

Exterior of BLMS mini is shown in Fig.1. For a drawing of **BLMS mini** with dimensions, please refer to Appendices A&B.

Fig.1. Drawing of **BLMS mini** light source.

Optical performance parameters and device settings are available on the Acceptance Test Report (ATR) enclosed with each **BLMS mini**. Please refer to Appendix B for an example of ATR sheet. A copy of an ATR can be requested from Superlum at any time by referring to a 6-digit serial number of your **BLMS mini** source. Source can operate in two different modes, "**Low power**" (LO mode) and "**High power**" (HI mode).

WARNING

BLMS mini sources emit invisible light that may have a potential hazard associated with CLASS 3B of IEC 60825-1 (Edition 2.0; 2007-03). Avoid the direct eye exposure from FC/APC light output. Further information regarding the safe use of lasers and laser safety classification may be obtained by contacting Superlum technical support.

It is vital that BLMS mini-series light sources are powered by using a stabilized +9V/2A DC supply with pulsations (DC 20 MHz) of maximum 20 mV (peak to peak). Failure to do so may cause catastrophic damage to the unit.

Note, if a switch-mode power supply is used low pulsations are absolutely required. Using any type of power supply other than a stabilized DC power supply, may cause unstable operation of the BLMS mini light source, a fatal failure or a latent damage of an SLD module and/or its reduced lifetime. **Reversed Polarity of the DC supply will result in immediate device failure.**

Integrated current and temperature controller drives an SLD module. Current and temperature controller has a soft-start SLD protection circuit. It is not possible to switch SLD on and off faster than 1.5 s by a remote control of BLMS-mini.

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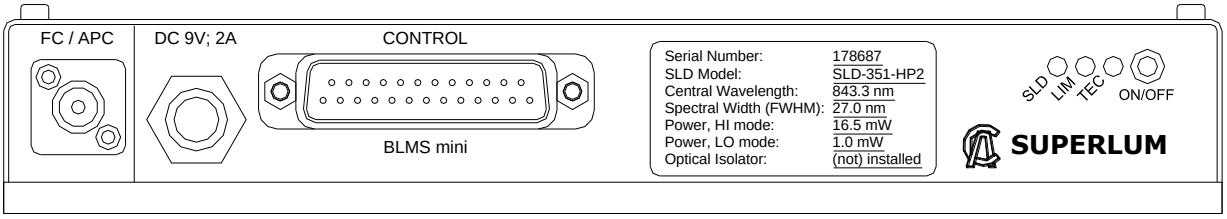
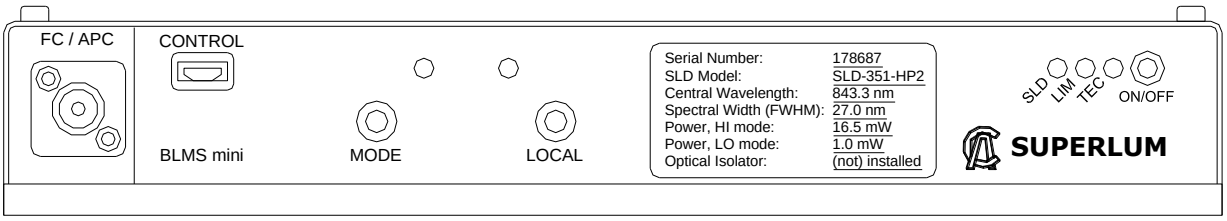
FRONT PANEL AND CONNECTIONS

Illustration of BLMS mini front panels are shown on Fig.2&3. BLMS mini can be equipped with either a 25-pin connector type **DB-25M** (Fig.2a) or a connector **mini USB type AB** (Fig.2b). All the outputs and controls are placed on the front panel. Power supply socket can be placed on the front panel (DB-25M version) or on the back panel (USB version).



a)



b)

Fig.2. BLMS mini front panel drawing for: a) DB-25M connector version; b) USB connector version.

INFORMATION LABEL

An information label can be found on the front panel of BLMS mini. It contains the serial number of the unit, central wavelength and spectral width in HI mode for SLD (in nm), output optical power in high power (HI) mode (mW), output optical power in low power (LO) mode (mW) and information if the optical isolator is installed. An example of the information label is shown on Fig.3. Spectral characteristics in LO mode may differ from those in HI mode.

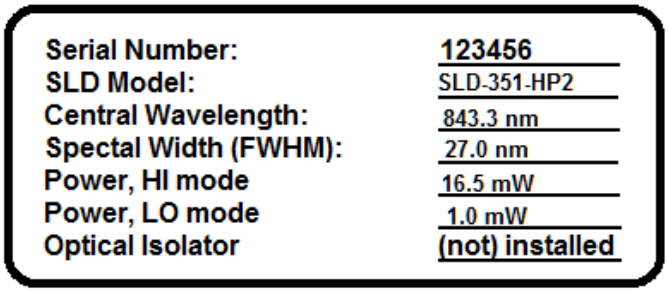


Fig.3. Information label on a front panel of BLMS mini module.

The following elements are placed on the front panel:

FRONT PANEL BUTTONS:

- ON/OFF – SLD module on/off switch;
- LOCAL* – remote/local control of the module;
- MODE* - HI/LO mode switch of the output.

*Only for BLMS mini with USB-connector.

Front panel connectors:

9V DC supply*, plug type Conxall, 17282-2PG-300;

- I/O control plug type DB-25M*;

- Connector USB mini type AB**;
- FC/APC optical output connector.

Front panel indicators:

- "TEC" – indicates LED of temperature controller;
- "SLD" – indicates LED of SLD emitter;
- "LIMIT" – time-to-service indication LED;
- LOCAL/REMOTE LED** - indicates the remote control status;
- HI/LO MODE LED** - indicates output operation mode.

Back panel connectors**:

- 9V DC supply, 5.5x2.1 mm-pole plug type.

*Only for BLMS mini with 25 DB-25M connector.
**Only for BLMS mini with USB connector.

DESCRIPTION OF CONNECTIONS AND INDICATORS for BLMS mini with USB connector

OPTICAL CONNECTION

FC/APC optical connector

Extreme care must be taken when connecting FC/APC connectors. It is strongly recommended that ONLY suitably qualified technicians make these connections. Only FC/APC type connectors can be used to connect any external optical equipment to a BLMS mini.
The use of any other type of connector may cause the device to malfunction. When connecting an FC/APC connector to a BLMS mini follow the FC/APC manufacturer's instructions.

ELECTRICAL CONNECTIONS

9V power supply connector:
Connector type: DC 5.1x2.2 mm pole plug connector (see Fig.4).

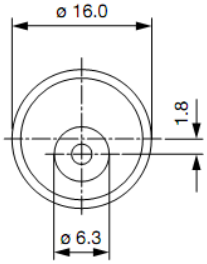


Fig.4. 9V power supply input connector. Dimensions are in [mm].

Requirements for 9 V DC power supply are given in the table below:

Supply voltage	9.0 –10.0 VDC
Supply voltage pulsations (DC 20 MHz)	20 mV (peak-to-peak) max.
Maximum supply current	2.0 A

It is vital that BLMS mini-series light sources are powered by using a stabilized +9V/2A DC supply with pulsations (DC 20 MHz) of maximum 20 mV (peak to peak). Failure to do so may cause catastrophic damage to the unit. Reversed polarity of the DC supply will result in immediate device failure.

I/0 control connector:
Connector type: USB mini-AB.

BLMS mini with USB connector is supplied with Superlum Remote Control Software. Alternatively, You can develop the control software by using BLMS mini remote commands listed in Appendix D.
USB module drivers should be installed automatically provided the Microsoft Windows XP or later version is used, an internet connection is available and the system user has sufficient rights. The drivers can be also downloaded from the website http://www.ftdichip.com/Drivers/D2XX.htm. Please, contact Superlum Support if you experience any difficulties while working with BLMS mini USB connections.

SUPERLUM COMPANION SOFTWARE
BLMS mini with USB connector is supplied with Superlum Companion Software. It allows to remotely switch the module on/off, switch HI/LO mode and generate the self-test file required for service information. To install the software, simply copy Superlum Companion Software executable file and a corresponding .ini file to a desired folder on Your PC. The interface of Superlum Companion Software is shown in Fig.5:

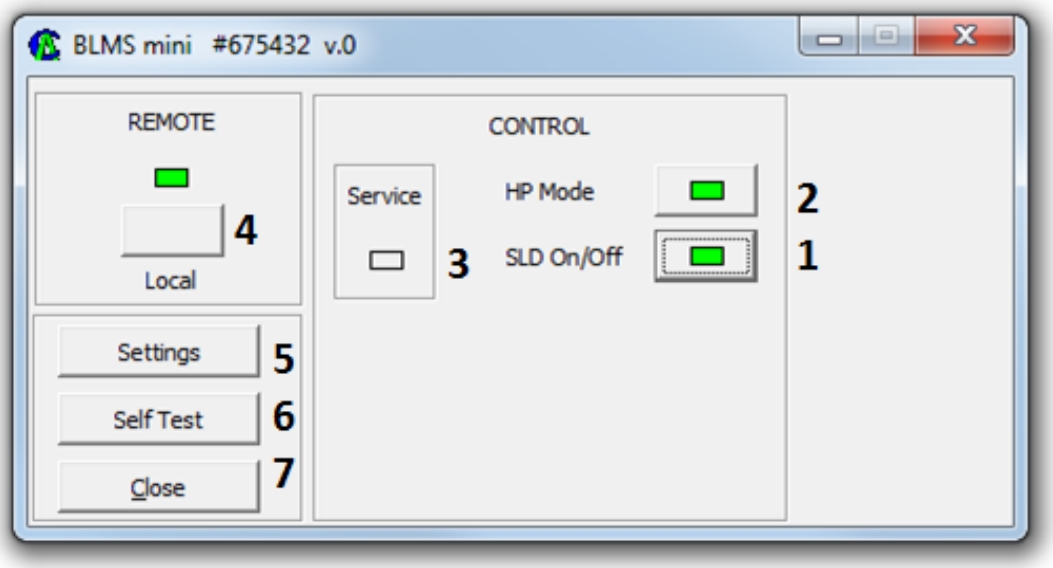


Fig.5. Superlum Companion Software interface buttons 1)switches SLD on/off; 2) switches between high and low output power modes; 3) service alarm indicator; 4) switches between local and remote states of the module; 5) allows changing the emulated com port connection; 6) generates Self-Test file required for a service information; 7) closes the software suite.

FRONT PANEL INDICATORS

BLMS mini with USB connector has five LEDs on the front panel. These LEDs allow easy visual control of BLMS mini operation status as described in **Table 1**:

Table 1. Control LEDs status description.

Indicating LED	LED Status	System Status
«SLD»	Idle	SLD is off
	Green	SLD is on
	Red	Normally it is a safety sign that the initial power is applied to BLMS mini. Press the “on/off” button to switch BLMS mini to normal regime. The SLD LED can be red if the SLD protection circuit has detected a rapid fluctuation of driving parameters. Turn the device off and then on to return to normal operation regime. Immediately contact Superlum support if LED remains red after pressing on/off button.
«TEC»	Idle	SLD temperature control is off. In case the TEC is off and SLD is on contact Superlum support immediately.
	Green	SLD temperature control is on
«LIM»	Flashing Yellow	Operating current is approaching the limit set value. Constant flashing over time - end of SLD lifetime is approaching. Meanwhile, the device retains its full functionality
	Yellow	End of SLD lifetime. The device may be used for some time, but the output power will decrease over time
	Idle	Normal regime
«LOCAL»	Idle	Module is in LOCAL mode, front panel buttons are enabled
	Red	Module is in REMOTE mode and is controlled by software. All buttons except for LOCAL are disabled
«MODE»	Red	Module is in HI mode
	Green	Module is in LO mode

Control LEDs “**SLD”** and “**TEC”** must light green and **“LIM”** LED must be idle when SLD emits light in a normal regime.

Switching between “Low Power (LO)/High Power (HI)” modes is ONLY possible when SLD is OFF. Turn SLD off before switching between REMOTE and LOCAL modes.

DESCRIPTION OF FRONT PANEL CONNECTIONS AND INDICATORS for BLMS mini with DB-25M connector

OPTICAL CONNECTION
FC/APC optical connector

Extreme care must be taken when connecting FC/APC connectors. It is strongly recommended that ONLY suitably qualified technicians make these connections. Only FC/APC type connector can be used to connect any external optical equipment to a BLMS mini.
The use of any other type of connector may cause the device to malfunction. When connecting an FC/APC connector to a BLMS mini follow the FC/APC manufacturer’s instructions.

ELECTRICAL CONNECTIONS
9V power supply connector:
Connector type: Conxall, 17282-2PG-300, see Fig.6.

Power Jack	Description

1	COMM
2	+9 V

Fig.6. 9V power supply connector and the pin description.
Requirements for 9 V DC power supply are given in the table below:

Supply voltage	9.0 –10.0 VDC
Supply voltage pulsations (DC 20 MHz)	20 mV (peak-to-peak) max.
Maximum supply current	2.0 A

It is vital that BLMS mini-series light sources are powered by using a stabilized +9V/2A DC supply with pulsations (DC 20 MHz) of maximum 20 mV (peak to peak). Failure to do so may cause catastrophic damage to the unit. Reversed polarity of the DC supply will result in immediate device failure.

I/0 control connector:
Connector type: DB-25M, see Fig.7:

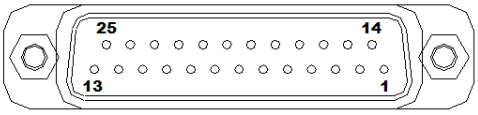


Fig.7. DB-25M connector with pin numbering.
Pin function descriptions for DB-25M are in Table below:

Table 2. Pin function descriptions for DB-25M connector.

Pin	Output Name	Type	Description
1	SLD_ERROR	OUTPUT (digital - active low)	SLD overall status (0 V – system fine, +U – error)
2	SLD_LIMIT	OUTPUT (digital - active low)	Output – SLD current limit status (+U – SLD current below limit, 0 V – SLD current limited by current limit)
3	SLD_GOOD	OUTPUT (digital - active low)	Output – SLD status; (0 V – SLD on, +U – SLD off)
4	TEC_GOOD	OUTPUT (digital - active low)	Output, temperature control status (OK or failure)
5	ICOMM	Digital GND	Common: Power supply to control Inputs/Outputs
6	MODE	OUTPUT (digital - active low)	Output – SLD mode (High Power (HI)/Low Power (LO)) (0 V – Low power, +U – High Power)
7	I_SLD_SET	OUTPUT (analog)	Set value of PD monitor photocurrent (APC mode)
8	SLD_LIMIT	OUTPUT (analog)	Output – SLD current limit status (+U – SLD current below limit, 0 V – SLD current limited by current limit)
9	I_SLD_REAL	OUTPUT (analog)	Control output, real SLD current value
10	PD_REAL	OUTPUT (analog)	Control output, PD monitor photocurrent
11	T_SET	OUTPUT (analog)	Control output – thermistor set value
12	T_REAL	OUTPUT (analog)	Control output – thermistor real value
13	COMM	Analog GND	COMMON – 9 V DC power supply
14	SLD_ON/OFF	INPUT (digital - active low)	Allows switching SLDs on and off by applying TTL signals.
15	MODE_SW	INPUT (digital - active low)	Control input, SLD power switching (HI ←→ LO modes)
16	IPWR	INPUT +5V	”+” Power supply to control inputs/outputs

System status can be checked in accordance with the Table 3:

Table 3. System status signals. Measured with Pin 5 (Digital GND).

Signal	Status	Description
TEC_GOOD	0 V + 5 V	SLD temperature OK SLD temperature is not OK
SLD_GOOD	0 V + 5 V	SLD emitter ON (direct current applied to SLD) SLD emitter OFF (direct current not applied to SLD)
MODE	+ 5 V 0 V	“High Power (HI)” SLD operation mode “Low Power (LO)” SLD operation mode
SLD_LIMIT	0 V + 5 V	SLD current equals to set value of SLD current limit SLD current below set value of SLD current limit
SLD_ERROR	0 V + 5 V	System alarm System OK (note SLD emitter may be either ON or OFF)

FRONT PANEL INDICATORS

BLMS mini with DB-25M connector has three LEDs on the front panel. These LEDs allow easy visual control of BLMS mini operation status as described in the **Table 4** below:

Table 4. Control LEDs status.

Indicating LED	LED Status	System Status
«SLD»	Idle	SLD is off
	Green	SLD is on
	Red	Normally it is a safety sign that the initial power is applied to BLMS mini. Press the “on/off” button to switch BLMS mini to normal regime. The SLD LED can be red if the SLD protection circuit has detected a rapid fluctuation of driving parameters. Turn the device off and then on to return to normal operation regime. Immediately contact Superlum support if LED remains red after pressing on/off button.
«TEC»	Idle	SLD temperature control is off. In case the TEC is off and SLD is on contact Superlum support immediately.
	Green	SLD temperature control is on
«LIM»	Flashing Yellow	Operating current is approaching the limit set value. Constant flashing over time - end of SLD lifetime is approaching. Meanwhile, the device retains its full functionality
	Yellow	End of SLD lifetime. The device may be used for some time, but the output power will decrease over time.
	Idle	Normal regime.

Control LEDs “**SLD”** and “**TEC”** must light green and **“LIM”** LED must be idle when SLD emits light in a normal regime.

RECOMMENDED CONNECTION TO CONTROL SLD ON/OFF MODE

Recommended connection of BLMS mini DB-25M connector to the external control circuit is shown in Fig.8. It allows “SLD ON/OFF” switching. The device is triggered by applying the negative pulse with 50 ms duration and the amplitude not exceeding -5V applied to the pin “**SLD_ON/OFF**”.

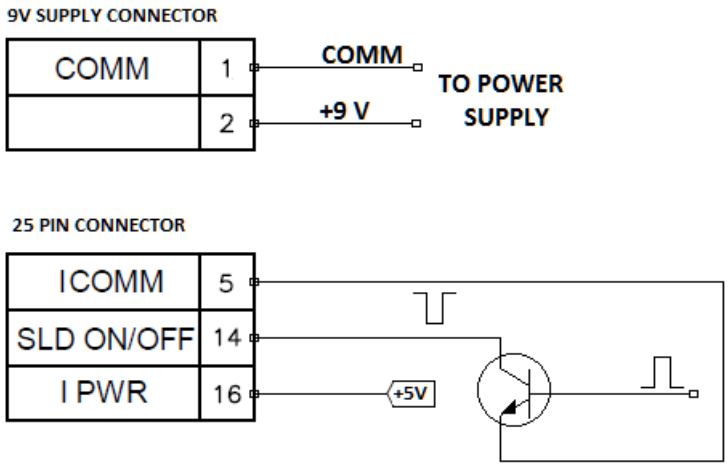


Fig.8. Recommended connections to control SLD ON/OFF mode.

RECOMMENDED CONNECTION TO CONTROL HI/LO MODE

Recommended connection of BLMS mini with DB-25M connector to the external control circuit is shown in Fig.9. It allows “Low Power (LO)/High Power (HI)” switching. The device is triggered by applying the negative pulse with 50 ms duration and the amplitude not exceeding -5V applied to the pin “**MODE_SW**”.

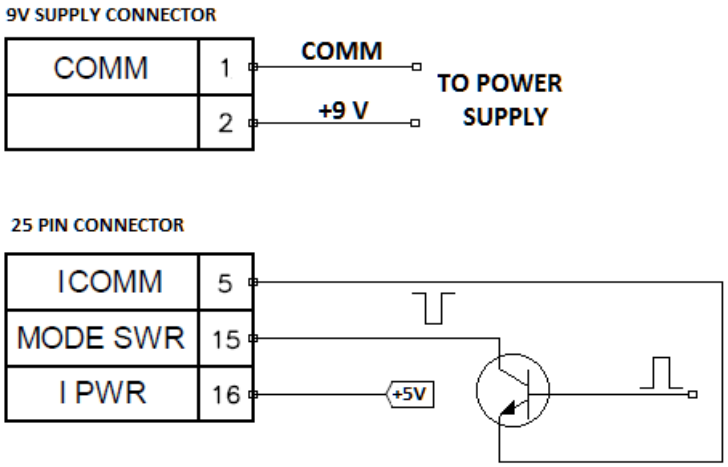


Fig.9. Recommended connections to control HI/LO mode.

Recommended Operating Conditions:

	PIN	Min	Max	Unit
Supply Voltage: (Maximum 1 Min)	IPWR	5.0	5.5 (7)	V

NOTE: Switching between HI/LO modes is ONLY possible when SLD is OFF.

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MEASUREMENTS OF BLMS mini PARAMETERS WITH 25 PIN CONNECTOR

All measurements must be done by DC multimeter with minimum input resistance of 10 MΩ.

Measurement of SLD current set value
Connect multimeter to PIN13 (COMM) and **PIN7** (I_SLD_SET) observing the polarity.
1 mV corresponds to 1 mA of SLD current [Set I_{sld} (mA) = U(PIN7) (mV)]

Measurement of real SLD current set value
Connect multimeter to PIN13 (COMM) and **PIN9** (I_SLD_REAL) observing the polarity.
1 mV corresponds to 1 mA of SLD current [Real I_{sld} (mA) = U(PIN9) (mV)]

Measurement of SLD current limit set value
Connect multimeter to PIN13 (COMM) and **PIN8** (Limit) observing the polarity.
1 mV corresponds to 1 mA of SLD current limit [Limit I_{sld} (mA) =U(PIN8) (mV)].

Measurement of thermistor set value
Connect multimeter to PIN13 (COMM and **PIN11** (T_SET) observing the polarity.
1 V corresponds to 10000 Ω thermistor set value [Set $R_{th}(\Omega)=10000\times U(PIN11)$ (V)]

Measurement of real thermistor value
Connect multimeter to PIN13 (COMM) and **PIN12** (T_REAL) observing the polarity.
1 V corresponds to 10000 Ω thermistor value [Real R_{th} (Ω)=10000 × U(PIN12) (V)]

Measurement of PD monitor photocurrent real value
Connect multimeter to PIN13 (COMM) and **PIN10** (PD_REAL) observing the polarity.
1 mV corresponds to 10 μA of PD monitor photocurrent [Real I_{pd} (μA)= U(PIN10)(mV)× 10]

OPTICAL PERFORMANCE PARAMETERS

An Acceptance Test Report (ATR) is issued with every BLMS mini light source. The ATR shows the unit serial number, optical performance parameters and the date of test. Please, see Appendix C for an example of ATR document. Additional information can be obtained from Superlum at any time on request by referring the serial number.

OTHER PARAMETERS

Parameter	Min	Typ	Max
Operation temperature range, ^{o}C	0		+40
Storage temperature range, ^{o}C	-30		+70

FIBER AND OPTICAL CONNECTION*

	Type	Comments
Connector type	FC/APC	FC/APC square flange mating sleeve connector is used.
Connector key type	Tight-fit/narrow	

*Fiber type may vary depending on the wavelength range of the BLMS mini and the choice of SM/PM output.

LASER SAFETY CONSIDERATIONS

The product emits invisible light that may have a potential hazard associated with CLASSES 3R-3B of IEC 60825-1 (Edition 2.0; 2007-03), depending on a particular S/N of the device and SLD type.

The BLMS mini light source is designed for integration with OEM photonics equipment and as such is outside the scope of applicable laser safety standards, i.e., IEC 60825-1. BLMS mini sources are not

required to have and do not have laser safety features such as remote interlocks, key operated master controls, or warning signals and labels. Note that any OEM products which have BLMS mini light source modules fitted may be subject to IEC 60825-1 and other applicable laser safety standards

Please contact Superlum Technical support for more details about laser safety issues for each particular model of BLMS mini light source modules.

FIRST TIME SWITCHING ON AND USE OF BLMS mini LIGHT SOURCE

For safe operation, reliable operation and long life of the unit it is VITAL that the following procedures be adhered to when using the BLMS mini.

1. Ensure the BLMS mini light source is securely anchored to an appropriate heat sink. Ensure free air circulation around the module. Connect a stabilized +9V/2A DC supply with pulsations (DC 20 MHz) of maximum 20 mV (peak to peak). Use of any other type of power supply may cause catastrophic damage to the unit, ensuring correct polarity. Do not make any other electrical connections at this stage.

BLMS mini light source may be used without heat sinks at the temperature up to +40 C. However, proper heat dissipation from BLMS mini body is required to ensure the stable operation at higher temperatures. Heat must be dissipated from the baseplate of BLMS mini. System design must ensure free air circulation around top cover if baseplate sits on a heat sink, as well as free air circulation around baseplate if BLMS mini is used without an additional heat sink.

2. Switch on the 9 V DC power. «TEC» LED indicator on the front panel should glow green.

3. SLD LED indicator should glow red. This is a safety sign the power has been applied to the unit. Press “on-off” button once to switch SLD LED indicator to idle. Push “on-off” button again to switch the SLD on. “SLD” LED will glow green (there is a short delay due to a soft start circuit). By default, BLMS mini is set to “Low Power” mode. Measure the output power with a dedicated power meter after the “SLD” LED illuminates and compare the results with the specified in ATR. Make sure that the output power is comparable (+/-10%) to the values listed in ATR.

4. By default, BLMS mini is set to “Low Power (LO)” mode. Switching between the LO/HI modes is ONLY possible when SLD is OFF. USB version of BLMS mini allows mode changing with front panel button (Fig.2) or remote control (Fig.5). DB-25M version of BLMS mini allows output mode changing with the DB-25M connector (Fig.9). Turn SLD off before switching between REMOTE and LOCAL modes.

5. Connect the light source to an optical spectrum analyzer. Compare output to the values stated in the ATR. Make sure there are no perceptible differences between the spectral data obtained during the measurement and the data listed in ATR.

6. Switching off. First, switch off SLD. Then, switch off BLMS mini.

NOTE: *In case of the above described spectral measurements SUPERLUM recommends using polarization insensitive OSAs to obtain adequate results, e.g. ANDO AQ6317B / Yokogawa AQ6370 OSAs.*

Polarization sensitive OSAs, or OSAs with MM fiber optical input may affect measurement results, i.e. introduce misbalance to measured spectral shapes, and additional distortions.

Please contact SUPERLUM for detailed information on a correct method of spectral measurements.

The light source is now ready for use. It is recommended to switch optical output off when you do not use the source, as it may extend lifetime of the light source.

WARNING: Potential Optical Feedback!

Optical feedback may result in permanent damage to the SLD emitter inside the module, depending on SLD optical power and a feedback level applied.

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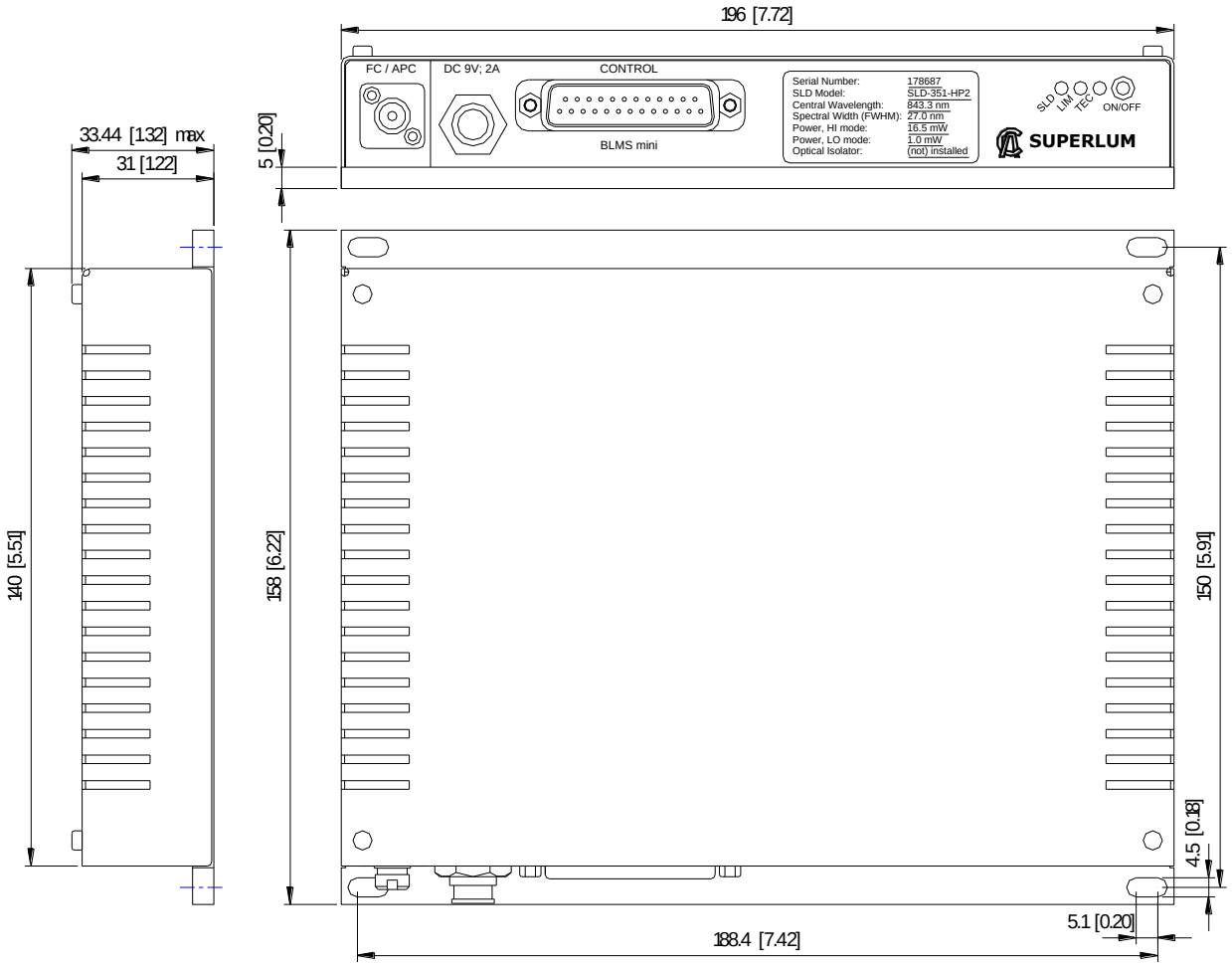
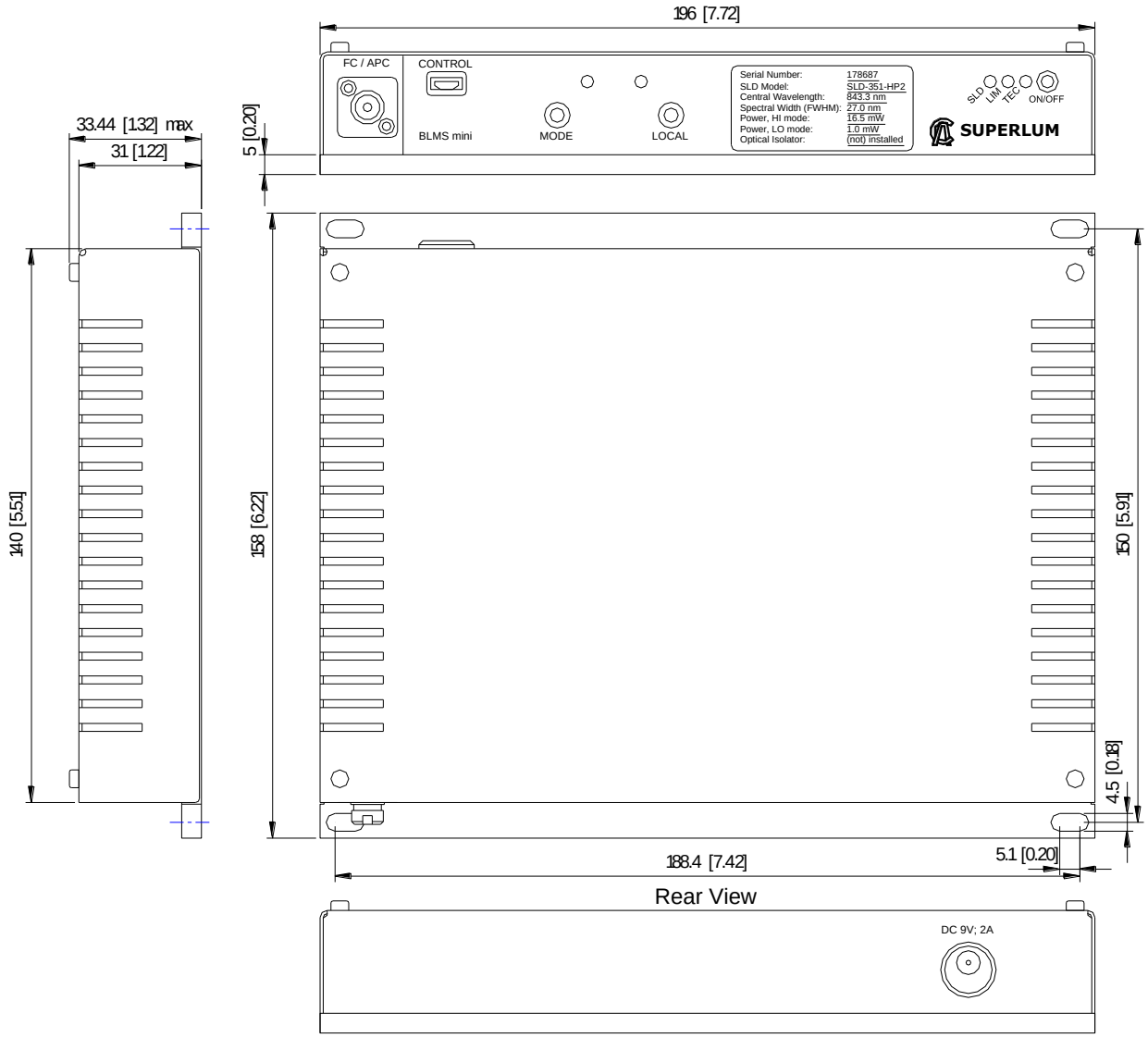
APPENDIX A.

BLMS mini illustration with dimensions for a version with DB-25M connector. The dimensions are in mm [inches].



APPENDIX B.

BLMS mini illustration, with dimensions for a version with USB connector. The dimensions are in mm [inches].



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APPENDIX C.

Example of an ATR enclosed with every BLMS mini-series module. Spectral characteristics are guaranteed for HI mode only. Spectral characteristics in LO mode may differ from those in HI mode.

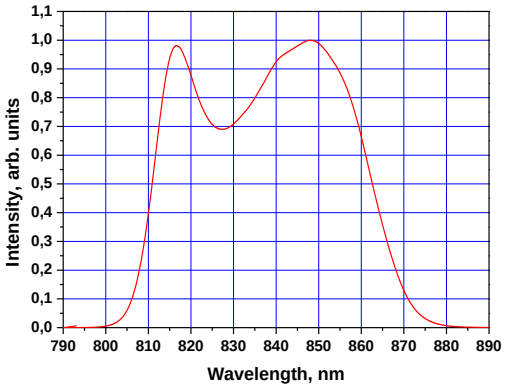
FINAL TEST SHEET Date: XX.XX.XXXX

Superlum Assembly type BLMS mini Serial No. 123456

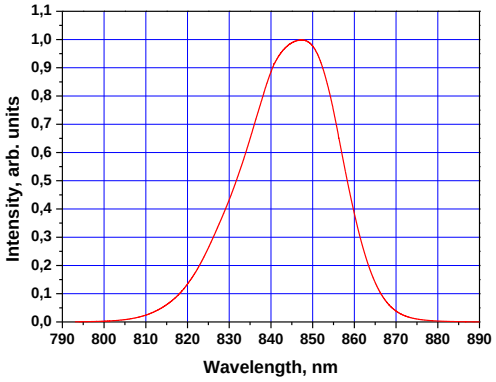
Optical Performance Parameters

Parameter	Rated	Actual
SM fiber output power, “Hi” mode, mW	>=15	16.5
SM fiber output power, “Low” mode, mW	2	2.16
Center wavelength “Hi” mode, nm	835-850	843.3
Spectrum width “Hi” mode, FWHM, nm	>=25	27.0
Maximum spectral ripple, “Hi” mode, peak-to-peak, %	<=4	0.9
PD monitor current “Hi” mode, mA	<=4	0.86
Secondary coherence subpeak, “Hi” mode, dB (10log)	<-20	-30.0
Drift of output power, 4h, +25 C +/-0.5C ambient, %	<1	0.4
SLD S/N		123456
Optical isolator S/N		12345

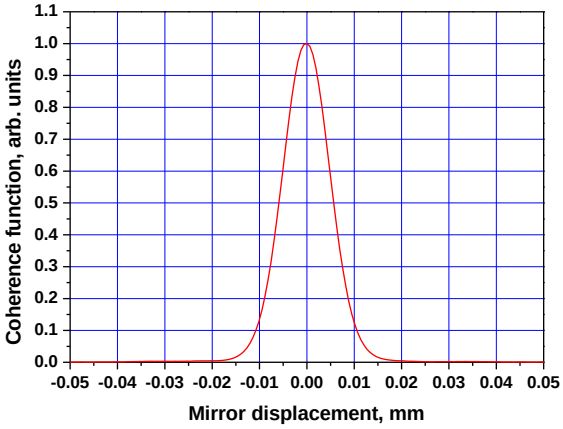
Optical Spectrum, “HI” mode

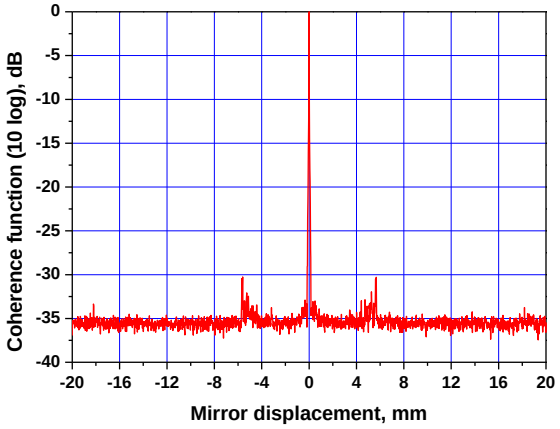


Optical Spectrum, “LO” mode



Coherence Function, “HI” mode





APPENDIX D.
BLMS mini with USB connector
RS-232 Emulation via USB Communication

Applications:

- Controlling SLD power.
- Switching SLD operating mode.
- SLD state monitoring (state of light-emitting diodes on the front panel of the device).
- Monitoring value of parameters:
  - photocurrent,
  - SLD current,
  - SLD current limit,
  - SLD temperature,
  - set PD current,
  - set SLD temperature.

RS-232 parameters

- **Baud rate** 57600
- **Parity** none
- **Data bits** 8
- **Start bits** 1
- **Stop bits** 1
- **Flow control** None
- **Galvanic isolation** 1kV
- **Data type** ASCII string

Data transfer protocol:

Query string structure

[command] [data] [CR] [LF]

Where
[command] – code of command
[data] – command data (optional)
[CR] [LF] is end of line signature.

Response string structure

[command] [data] [CR] [LF]

Where:
[command] – start of response string (always “A”)
[data] – data
[CR] [LF] is end of line indicator.
Note: [CR] – the ASCII decimal “13” byte; [LF] – the ASCII decimal “10” byte. Windows end of line indicator [CR] [LF] is equal to “ENTER” key press. This is actual when using standard terminal utility.

Remote Command Set
Commands summary:

Command	Data1	Data2	Description
S0	-	-	Read device identification string
S1	0	-	Current Local/Remote mode query
S1	1	-	Set Local mode
S1	2	-	Set Remote mode
S2	0	-	Read controller state
S2	1	-	Turn SLD power on/off
S3	1	Parameter #[1..6]	Read parameter
S4	0	-	Read controller state
S4	1	-	Set HI/LO modes

S0: Read device identification string
Command – [S0]
Data – no
Response:
[A] [0] [data#1] [data#2] [data#3] [data#4] [CR] [LF]

Where:
[data#1] – device type [0…9], 1 byte, 5 for BLMS mini
[data#2] – number of channels (SLD controllers) in the device. Can take values [1 … 4], 1 byte;
[data#3] – Number of the version of the managing micro program. Can take values [0 … 9], the size of field – 1 byte.
[data#4] – Serial number. 6 bytes.

Response in case of error:
[A] [E] [CR] [LF]

S1: Set LOCAL/REMOTE mode
Command – [**S1**]

Data1	Description
0	Read current mode
1	Set **LOCAL** mode
2	Set **REMOTE** mode

Response:
[A] [1] [Data#1] [CR] [LF]

Where:
[Data#1] – Mode after applying the command.

Data#1	Description
1	LOCAL mode
2	REMOTE mode
E	Error

Note:

1. After power on, the device is automatically set to **LOCAL** mode;
2. After receiving of any correct command except **S0** and **S11** or **S10,** the device is set to **REMOTE** mode.

S2: Turn SLD power on/off
Read SLD controllers state (state of indicators on front panel)
Command – [**S2**]
Data, 1 byte
- [0] – to read state.
- [1] –switch SLD controller power on/off

Response:
[A] [2] [Data#1] [CR] [LF]

Where:
[Data#1] – Code denoting controller state after applying the command.
Number of data depends on number of SLD controllers in the device.
The State code of each SLD controller is a decimal number (00-31). The meaning of each bit in this number is given in the table below:

Signal	Bit	Note
TEC_GOOD	0	'1' for normal SLD temperature '0' for bad SLD temperature
SLD_GOOD	1	'1' if SLD power is on '0' if SLD power is off or failure occurred
LIMIT	2	'1' SLD current limit reached
SLD_ERROR	3	'1' failure occurred
MODE	4	'1' HI mode '0' LO mode

Error response:
[A] [E] [CR] [LF]

S3: Read measuring parameter value

Command – [**S3**]
Data – [Data1], where
[Data1] – parameter number[1…6].

Numeration of parameters.

Number	**Parameter**	**Note**
[1]	PD	Monitor photocurrent value
[2]	I_SLD_REAL	Real SLD current value
[3]	LIMIT	Maximum SLD current value
[4]	T_SET	Set SLD temperature value
[5]	I_PD_SET	Set PD current value
[6]	T_REAL	Real SLD temperature value

Response:
[A41][Data#1] [Data#2] [Data#3] [CR] [LF]

Where:
[Data#1] – measured parameter number [1-6] – 1 byte;
[Data#2] – SLD controllers states;
[Data#3] – Measured parameter value. Maximum size of data field – 5 bytes.

Error response:
[A] [E] [CR] [LF]

Parameters stepping:
Set and real SLD temperature – thermistor resistance, 1 ohm
Monitor photocurrent – 1 uA
Set and real PD current – 1 uA
SLD current limit – 0,1 mA

S4: Switch HI / LO modes. Read SLD Controller state.

Command – [**S4**]
Data1 – [1] – change mode
– [0] – read current state of SLD controller

Response:
[A] [4] [Data] [CR] [LF]

Where:
[Data] – State code of SLD controller after applying the command (see table in [S2] command description).

Error response:
[A] [E] [CR] [LF]

Note: This command has effect only if SLD current is turned off.

NOTES:

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