



## MatchBox<sub>2</sub> series

### LASERS FOR ANALYTICAL INSTRUMENTATION

- CW Lasers (Broad and Narrow Spectrum)
- Nanosecond SLM Lasers
- Accessories

## ADVANTAGES

- One size
- One control interface
- One voltage (+5 VDC)
- One software
- Many wavelengths
- Low cost
- Self-contained design
- Compact and efficient
- Variety of accessories
- Dedicated for OEM

## APPLICATIONS

### CW BROAD SPECTRUM LASERS

- Fluorescence spectroscopy
- Scanning Microscopy
- Sorting
- Flow cytometry
- Metrology
- Optical guiding
- UV curing
- 3D printing
- Excitation

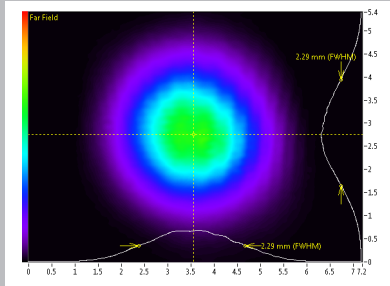
### CW NARROW SPECTRUM LASERS

- Raman Spectroscopy
- Holography
- Inspection

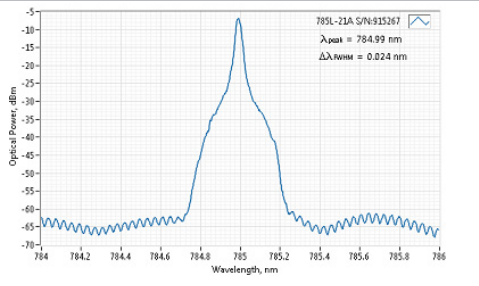
### NANOSECOND SLM LASERS

- Supercontinuum Generation
- Pulsed Laser Seeding
- Laser Induced Breakdown Spectroscopy (LIBS)
- Range Finding
- Raman Spectroscopy
- Holography

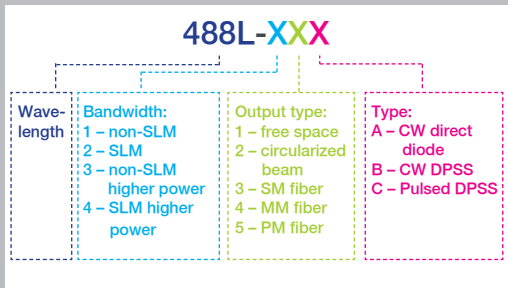
# GENERAL INFORMATION



Beam profile of 1064L-11B  
(far field)



Spectrum of 785L-21A SLM laser  
(measurement is limited by spectrum analyzer)



Part number structure



Standard pinout

# CONTROL SOFTWARE

MatchBox 2 control. 1v5. User edition.

|  |   |  |
|--|---|--|
| <b>Application settings</b><br><b>Settings</b><br>I <sub>LD</sub> (max. 180mA) <input type="text" value="180"/><br>TEC1 temp. <input type="text" value="30"/><br>TEC2 temp. <input type="text" value="18"/><br><b>Optical power settings</b><br>Optical power <input type="text" value="1200"/><br><input checked="" type="radio"/> DAC value <input type="radio"/> mW (if calibrated) | <b>Device functions</b><br><b>Readings</b><br>LD current 115.8mA APC<br>TEC1 temp. 25.684 -25%<br>TEC2 temp. N.A. 0%<br>Body temp. 23.590<br>Access level 1<br><input type="checkbox"/> Laser self start after power on | <b>Device information</b><br>Device found at COM5<br>Firmware for MatchBox II v1.6.6<br>Laser S/N:915302<br>Laser model:405L-15A<br>171h 8 min.<br>120 times |
|--|---|--|

Start Stop

**LASER ON**

**MatchBox 2** series

| Wave-length (nm)                       | Type  | Output power (free space) | Output power (SM PM fiber) | Output power (MM fiber) | Wave-length tolerance +/- | Spectral linewidth FWHM (typical) | Noise (20 Hz – 20 MHz) |
|--|-------|---------------------------|----------------------------|-------------------------|---------------------------|-----------------------------------|------------------------|
| <b>BROAD SPECTRUM CW LASERS</b>        |       |                           |                            |                         |                           |                                   |                        |
| 405 nm                                 | Diode | 130 mW                    | 40 mW                      | 90 mW                   | 3 nm                      | 0.5 nm                            | 0.5%                   |
| 445 nm                                 | Diode | 50 mW                     | 15 mW                      | 35 mW                   | 3 nm                      | 0.5 nm                            | 0.5%                   |
| 488 nm                                 | Diode | 45 mW                     | 20 mW                      | 30 mW                   | 3 nm                      | 0.5 nm                            | 0.5%                   |
| 520 nm                                 | Diode | 40 mW                     | 20 mW                      | 30 mW                   | 5 nm                      | 0.5 nm                            | 0.5%                   |
| 532.1 nm                               | DPSS  | 200 mW                    | 100 mW                     | 160 mW                  | 0.1 nm                    | 0.3 nm                            | N/A                    |
|  | DPSS  | 500 mW                    | N/A                        | 350 mW                  | 0.1 nm                    | 0.3 nm                            | N/A                    |
| 635 nm                                 | Diode | 150 mW                    | 75 mW                      | 120 mW                  | 3 nm                      | 0.5 nm                            | 0.5%                   |
| 660 nm                                 | Diode | 110 mW                    | 45 mW                      | 90 mW                   | 3 nm                      | 0.5 nm                            | 0.5%                   |
| 785 nm                                 | Diode | 150 mW                    | 60 mW                      | 120 mW                  | 3 nm                      | 0.5 nm                            | 0.5%                   |
| 830 nm                                 | Diode | 130 mW                    | 60 mW                      | 90 mW                   | 10 nm                     | 0.5 nm                            | 0.5%                   |
| 850 nm                                 | Diode | 130 mW                    | 60 mW                      | 90 mW                   | 10 nm                     | 0.5 nm                            | 0.5%                   |
| 915 nm                                 | Diode | 200 mW                    | 80 mW                      | 140 mW                  | 3 nm                      | 0.5 nm                            | 0.5%                   |
| 975 nm                                 | Diode | 200 mW                    | 80 mW                      | 120 mW                  | 3 nm                      | 0.5 nm                            | 0.5%                   |
| 980 nm                                 | Diode | 200 mW                    | 80 mW                      | 120 mW                  | 3 nm                      | 0.5 nm                            | 0.5%                   |
| 1030 nm                                | DPSS  | 500 mW                    | 300 mW                     | 400 mW                  | 2 nm                      | 2 nm                              | N/A                    |
| 1064 nm                                | DPSS  | 500 mW                    | 300 mW                     | 400 mW                  | 0.3 nm                    | 0.5 nm                            | N/A                    |
| <b>NARROW SPECTRUM (SLM) CW LASERS</b> |       |                           |                            |                         |                           |                                   |                        |
| 405 nm                                 | Diode | 30 mW                     | 10 mW                      | 20 mW                   | 0.3 nm                    | <3 pm                             | 0.5%                   |
| 488 nm                                 | Diode | 30 mW                     | 10 mW                      | 15 mW                   | 0.2 nm                    | <3 pm                             | 0.5%                   |
| 532 nm                                 | DPSS  | 50 mW                     | 25 mW                      | 40 mW                   | 0.3 nm                    | <0.2 pm                           | 1%                     |
| 632.8 nm                               | Diode | 60 mW                     | 30 mW                      | 40 mW                   | 0.1 nm                    | <2 pm                             | 0.5%                   |
| 635 nm                                 | Diode | 90 mW                     | 45 mW                      | 65 mW                   | 0.1 nm                    | <2 pm                             | 0.5%                   |
| 783 nm                                 | Diode | 90 mW                     | 45 mW                      | 60 mW                   | 0.1 nm                    | <2 pm                             | 0.5%                   |
| 785 nm                                 | Diode | 100 mW                    | 50 mW                      | 70 mW                   | 0.1 nm                    | <2 pm                             | 0.5%                   |
|  | Diode | 500 mW                    | N/A                        | 350 mW                  | 0.5 nm                    | <75 pm                            | 0.5%                   |
| 808 nm                                 | Diode | 100 mW                    | 50 mW                      | 80 mW                   | 0.2 nm                    | <2 pm                             | 0.5%                   |
| 1029 nm                                | DPSS  | 400 mW                    | 200 mW                     | 280 mW                  | 0.25 nm                   | <75 pm                            | 1%                     |
| 1064                                   | DPSS  | 400 mW                    | 200 mW                     | 280 mW                  | 0.3 nm                    | <0.2 pm                           | 1%                     |

Other wavelengths on request:

473 nm, 491 nm, 561 nm, 589 nm, 593 nm, 671 nm, 946 nm, 1123 nm, 1319 nm, 1342 nm.

## OTHER PARAMETERS

### BEAM PROPERTIES:

- Transversal mode: TEM00, except 500 mW versions of 532 nm and 785 nm
- Beam diameter at aperture (1/e<sup>2</sup>): <2 mm for diode and ~1 mm for DPSS
- Beam divergence (full angle): <2 mrad for diode and <1.5 mrad for DPSS, except 500 mW versions of 532 nm and 785 nm
- Beam pointing stability: <1 mrad/C°
- Bore sight error: +/-2 mrad (vertical), +/-3 mrad (horizontal)
- Beam quality, M2: <1.3, except multimode 500 mW versions of 532 nm and 785 nm
- Polarization ratio: better than 500:1

### POWER STABILITY:

- Power stability of free-space lasers is <1 % RMS over 8 hrs
- Power stability of fiber-coupled lasers is <2 % RMS over 8 hrs
- Non-SLM DPSS lasers have significant noise peaks at above 200 kHz

### MODULATION:

- Broad spectrum diode lasers can be modulated up to more than 10 MHz via TTL pin
- For SLM diode and all DPSS lasers, the TTL pin is configured for fan speed control
- DPSS lasers can be modulated at low frequencies (up to few kHz) but modulation is implemented upon request

### FIBER SPECS:

- SLM fiber coupled lasers are made with FC/APC connectors
- Non-SLM lasers are made with FC/PC connectors
- Standard length of a fiber is 1 m to 1.2 m
- Polarization extinction ratio (PM fiber): better than 20 dB
- Polarization rotation (PM fiber): less than 5 degree

### PHYSICAL PROPERTIES:

- Control interface type: UART serial bus, convertible to USB with standard accessories
- External power supply requirement: +5VDC, 5A for DPSS, 1.5 A for diode up to 200 mW
- Dimensions (L-W-H): 50 x 30 x 16 mm (excluding pins and output window)
- Beam height from the base: 10.4 mm (+/- 0.3 mm)
- Heatsink requirement: diode <1 °C/W, DPSS <0.5 °C/W
- Optimum heatsink temperature (non-condensing): +15...+30 °C
- Max. heatsink temperature 40 °C
- Internal temperature stabilization: TEC
- Overheat protection: Yes
- Storage temperature (non-condensing): -10 to +50 °C
- Warranty: 12 months,
- Hours limitation of 5000 hrs applies for 405, 445, 488, 515, 633, 635, 660 nm diode lasers. Operational time calculation is based on an internal EPROM counter

### COMPATIBILITY:

- ROHS
- General Product Safety Directive (GPSD) 2001/95/EC
- Electromagnetic Compatibility (EMC) Directive 2004/108/EC
- IEC60825-1:2014 (compliant only using additional accessories)

Custom wavelengths and specifications are available on request

## NANOSECOND PULSED LASERS



### ADVANTAGES

- Same size and a physical interface as of CW MatchBox lasers.
- High pulse energy
- Single-longitudinal-mode (SLM) spectrum
- High average power
- Superb pulse-to-pulse stability
- Very low jitter

### SPECIFICATION (PRELIMINARY)

| Wave-length | Output Power | Pulse duration | Repetition rate | Pulse energy | Pulse-to-pulse stability (RMS) |
|-------------|--------------|----------------|-----------------|--------------|--------------------------------|
| 1029 nm     | 500 mW       | 3.5 ns         | 20 kHz          | 25 $\mu$ J   | <0.5 %                         |
| 514.5 nm    | 110 mW       | 3.5 ns         |                 | 5.5 $\mu$ J  |                                |
| 343 nm*     | 30 mW*       | 3.5 ns         |                 | 1.5 $\mu$ J  |                                |

\* Preliminary specifications

## ACCESSORIES



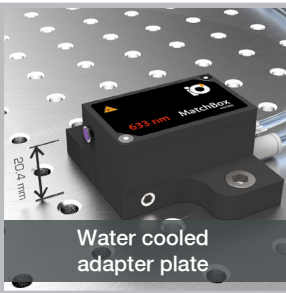
4-port USB power supply



25 W power supply



USB power cable



Water cooled  
adapter plate



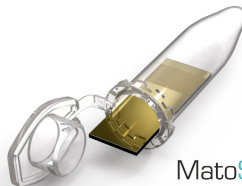
Adapter to M6  
taped breadboard



Air-cooled heatsink for  
DPSS lasers



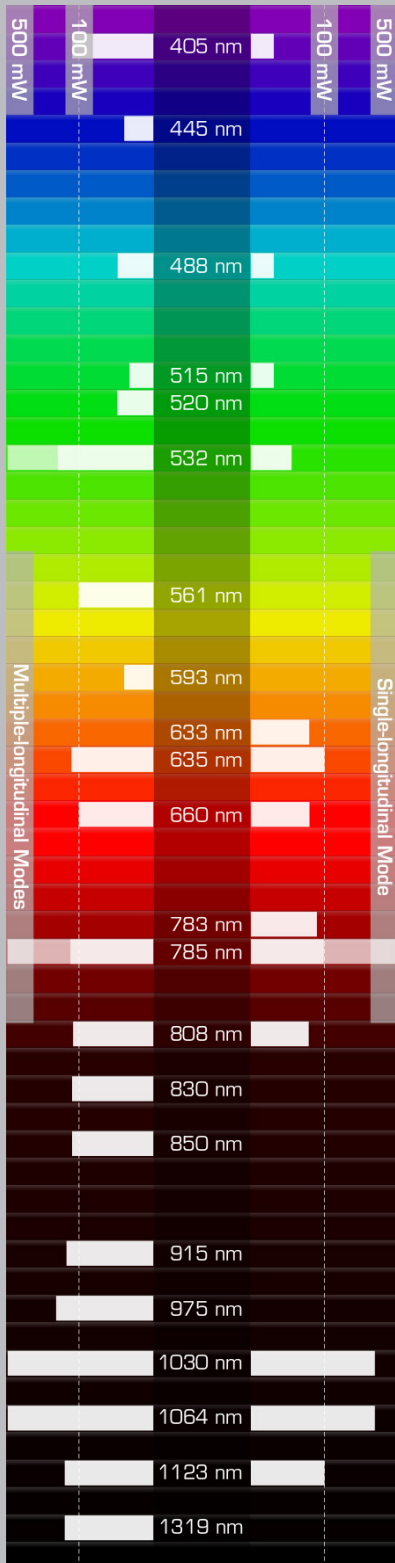
Protective Goggles



MatoS  
Gold plated  
SERS substrates



RandaS  
Silver plated  
SERS substrates



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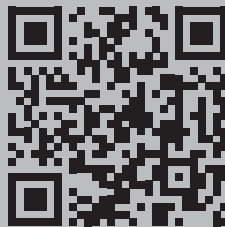
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