About MatchBox Combiner

The MatchBox Combiner is a configurable turnkey emitter/detector system for life sciences, sorting and particle analysis applications. It has a standard MatchBox footprint and is compatible with a rich set of MatchBox® accessories.

Features

- 2 to 4 individually controllable laser diode drivers
- Ultra-compact All-in-One design*
- Thermally stabilized optics
- Monolithic design for hands-free operation
- Fiber coupling and beam shaping options
- Automatic current control
- QC3.0 compatible USB-C power input (in breakout box)

*The laser head includes optics and driving electronics within a single enclosure.

Customization

- Desired set of 2 to 4 emitters/detectors
- Customer specified set of dichroic mirrors, clean-up and blocking filters
- Common output beam shaper, such as line generator, DOE, focusing optics, etc.
- Fiber end collimators and beam shapers
- Pre-programmed modulation patterns
- Customer specified beam diameter and divergence
- Customer specified fiber pigtail
- Amplifier circuits for avalanche photodiodes

Novel Product Concept

The MatchBox® laser combiner includes from 2 to 4 laser diode drivers and digital control electronics, which allows smart control and diagnostics of the complete module.

The laser unit is designed as an integration-ready electro-optics unit, which can be connected to a control mainboard and power supply of an instrument. This way the laser/detector unit provides unprecedented compactness and functionality. Thus mass production of multi-wavelength instruments becomes much easier and faster.

Communication protocol

MatchBox® series lasers feature a Universal Asynchronous Receiver/Transmitter (UART) controller interface. The pinout of MatchBox Combiner is an expanded version of standard MB2 pin-out. The lower row of pins is the same as for single-wavelength lasers, while the second (upper) row is added for individual TTL modulation of each laser diode installed in the combiner.
Breakout Box

A 'breakout box' is used for converting UART into USB or RS232 protocols. The converter chip for USB is 'Silicon Labs CP2102' and for the RS232 it is 'MAX232'. Additionally, the breakout box of MatchBox combiner is equipped with the necessary circuit for communication with and QC3.0 power supplies.

Pins for Tight Integration

10 pins at the back of the laser combiner provide full access to the complete functionality of the combiner.

Pins are located at the backside of the enclosure and distributed in a way, which allows for implementing a mechanical reverse lock.

Prerequisites for such integration are a microcontroller mainboard supporting UART communication, 9V (QC3.0 compliant) power supply and 2 to 4 TTL channels for an individual on/off modulation (or fast PWM power control) of each laser diode.

Pin-out Explained

- L0 on/off diode TTL, 5V tolerant
- L1 on/off diode TTL, 5V tolerant
- GND ground connected to the laser body
- L2 on/off diode TTL, 5V tolerant
- L3 on/off diode TTL, 5V tolerant
- GND ground connected to the laser body
- Prog. pin needs to be programmed to set 9V voltage if a QC3 compliant USB power supply is used. Another use of this pin is to control fan of a heatsink, based on laser body temperature.
- Rx UART communication, 5V tolerant
- Tx UART communication, 5V tolerant
- Vcc 9V or QC3.0 compliant power supply.**

** for communication with QC3.0 compliant power supply, the programmable pin needs to be configured for communication with the power supply.
Breakout Box Explained

The Breakout Box contains UART-USB converter circuit and conventional connection ports in a plastic housing.

- Data USB (left) is used for communication with a PC
- Interlock occupies two pins. When the pins are shortened with an interlocking loop, the laser can be operated
- L0, L1, L2, L3 are all TTL modulation pins for corresponding LD channels or read-out pins for photodetectors, depending on product configuration.
- Power USB-C (right) connector is used for connection to a QC3.0 compatible power supply.
- FAN ctrl. connector (not visible, on the right side of the breakout box) is compatible with all our fan cooled heat sinks.

Software Interface

The MatchBox® laser control software is used for checking preset parameters, such as the max. laser diode current, target temperatures for laser internal diode, laser body and actual measured values of these parameters, as well as the load percentage of the Peltier elements. This is very helpful for laser diode age tracking and other troubleshooting actions.

The software window is divided into four segments. Each segment represents a different control field of the MatchBox® laser:

Right above the first segment, you can see a port number, an item name, a serial number, and a hardware version. The first segment is used for turning on the power of the laser, but the laser isn't emitting light. A warning sign can be seen in the segment too. It indicates whether the laser power is on or off. The next parameter seen in this segment is the operating mode of the laser.

The second section of the software window is used for laser power control. You can enable or disable laser radiation, change units of optical power setting. This column also shows the current of the laser diode - its maximum value and the actual current. In the status bar, if the circle is green, the laser is emitting light, if it is grey, laser radiation is turned off.

The third section is for controlling operation modes of the laser - ACC/APC, Auto-Warm-up, Auto-Start.

The last section is for observing the temperature of the laser body and the laser internal diode, cooler status, Fan load, and laser voltage.

Click the button below to download the software:

DOWNLOAD
Heatsinks

A water-cooled adapter to standard M6 breadboard. Used for achieving top stability and dissipating large amount of heat.

A low profile forced air cooler has an integrated centrifugal fan. Very efficient for dissipation of large amount of excess heat.

A cost-efficient high-capacity forced air-cooler. It is used mainly for direct diode and low power DPSS lasers.

A very efficient, TEC and FAN based, cooler. It is used mainly with high power DPSS and high parameter stability requiring lasers.

Power Supplies

A power supply for high power DPSS lasers.

A low-cost power supply for diode lasers.

7Ah power bank ensures up to 48 hours of stable operation of Matchbox lasers.
Advantages

- Easy to integrate (smallest enclosure on the market)
- Convenient to arrange in the proximity of a working area (use of fiber pigtails is often not necessary)
- Standard Package (MatchBox®)
- User-friendly software with multiple parameter monitoring
- Low power consumption in standby-mode (important for battery-powered applications)
- Excellent beam pointing angle and beam position accuracy
- High cooling capacity
- Rugged enclosure
- Operational hours counter
- On/Off cycle counter
- Smart over-heat protection
- USB- power for direct diode lasers
- Variety of accessories
- Space-saving pinhead connector

What's in the Box?

- Laser Source (integrated power electronics in the same enclosure)
- 1 g of thermal grease
- 2 screws of M2.5x20mm for fixing the laser to a mounting plate. Tightening torque 0.25 - 0.35 N·m
- Hex key: 1,5 mm; BN:1169; DIN:911

Contact one of our specialists today by calling 636.272.7227 or Click Here

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