QD LASER

QBB4M01

Preliminary

Driver board for 4 wavelength multiplexing laser module

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1. DESCRIPTION

The QBBM401 is a driver board for 4 wavelength multiplexing laser module of QLM4xx series. This driver can control laser output power, module temperature under CW/pulse operation controlled by PC software via USB interface. Only single +12V power supply is required for the board operation.

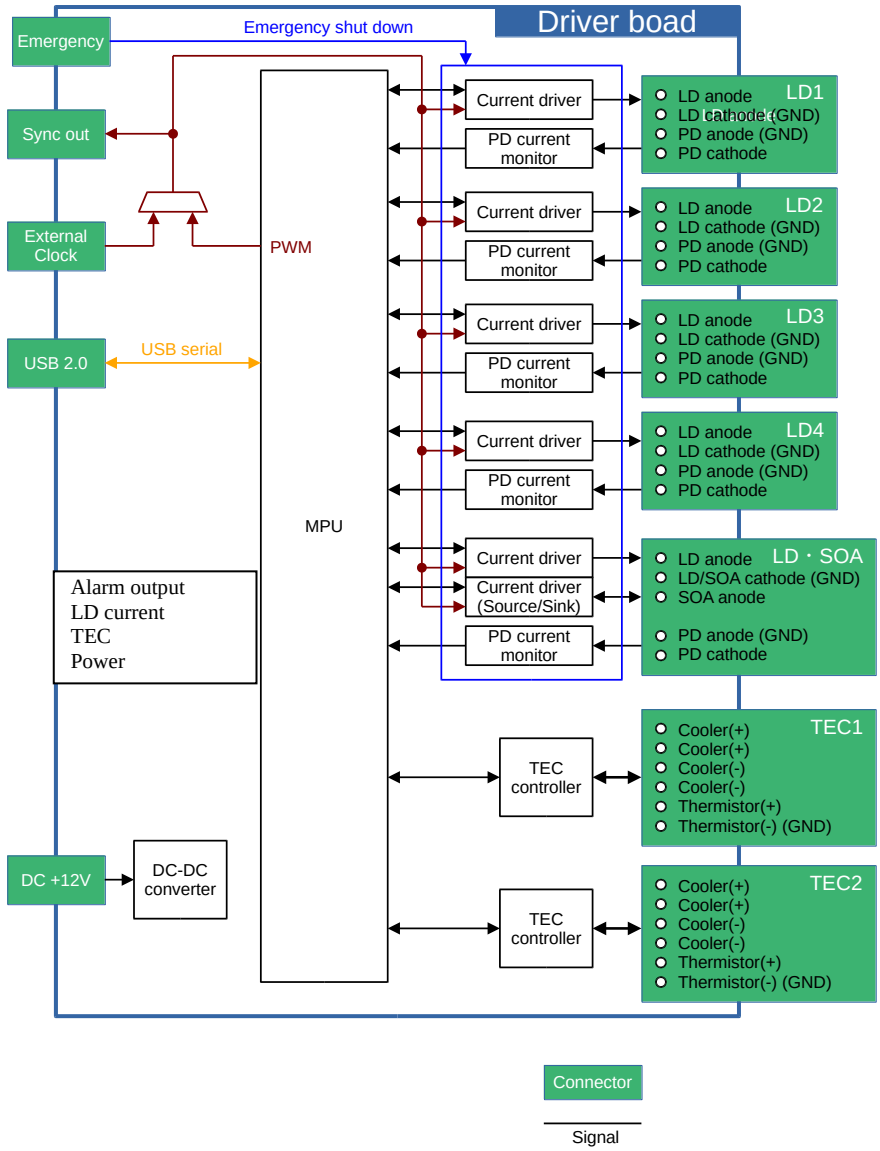
2. FEATURES

- Designed for 4 wavelength multiplexing laser module of QLM4xx series
- USB interface allows to set the laser power, modulation sequence and temperature using PC software
- CW and pulsed operation
- APC/ACC control available
- Equipped with the dedicated driver and DFB optimization sequence for visible compact module

3. APPLICATION

- Fluorescence microscope
- Spectroscopy
- Biomedical applications

4. FUNCTION BLOCK DIAGRAM



www.aptechnologies.co.uk
AP Technologies Limited The Coach House Watery Lane Bath BA2 1RL
T: +44 (0) 1225 780400 F: +44 (0) 8701 266449 E: info@aptechnologies.co.uk

5. ABSOLUTE MAXIMUM RATINGS

(T_c = 25°C, unless otherwise specified)

PARAMETER	SYMBOL	RATING	UNIT
Operation Temperature	T_c	20 to 30	°C
Storage Temperature	T_{stg}	-10 to 50	°C
Storage Relative Humidity	RH	< 90 (no codensation)	%

6. SPECIFICATIONS

6-1. Specifications of LD1 to LD4

(T_c = 25°C, unless otherwise specified)

#	Item	Unit	LD1	LD2	LD3	LD4	Remark
1	Types of LD	nm	488	(515)	660	785	#1
2	Maximum LD current	mA	200	300	200	200	
3	Resolution of LD current	mA	> 0.05	> 0.05	> 0.05	> 0.05	
4	Maximum LD voltage	V	6.2	7.5	3.0		
5	Modulation frequency	kHz	<= 100		<= 100		Target value, #2
6	Pulse width	μs	>= 5		>= 5		
7	Tr/Tf (10-90%)	μs	< 5		< 5		Target value

6-2. Specifications of DFB-SOA

DFB-SOA is for compact visible laser operation.

(T_c = 25°C, unless otherwise specified)

#	Item	Unit	LD	SOA	Remark
1	Maximum LD current	mA	300	500	
2	Resolution of LD current	mA	0.08	0.2	
3	Maximum LD voltage	V	4.0		
4	Modulation frequency	kHz	N/A	<= 100	Target value, #2
5	Pulse width	μs	N/A	>= 5	
6	Tr/Tf (10-90%)	μs	N/A	< 5	Target value

#1: Wavelength combination is an example. LD1 and LD2 are for lasers to operatte high voltage for GaN systems. LD3 and LD4 are for lasers for GaAs systems.

#2: Minimum modulation frequency under internal trigger is 100Hz.

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6-3. Specifications of TEC1 and 2

#	Item	Unit	TEC1	TEC2	Remark
1	Operation temperature	℃	20-30		
2	Resolution of temperature	℃	<= 1		
3	Maximum TEC voltage	V	4.5		
4	Maximum TEC current	A	1.5		
5	Temperature stability	℃	±0.05		Target value

6-4. Other Specifications

6-4-1. Input of External Clock

Input of external clock is 3.3V CMOS level. High or 50 Ω can be selected as input impedance by connection of jumper pin on circuit. Input signal is used as trigger of pulse width modulation for lasers, and duty of input signal is used as duty of pulse width modulation.

6-4-2. Output of Sync Out

Output of sync out is 3.3V CMOS level, and output of low impedance. It is output as the waveform copy of duty of pulse width modulation.

6-4-3. USB 2.0

USB 2.0 is a serial port for the connection of PC.

6-4-4. DC Input Voltage

DC input voltage is + 12 V, and acceptable tolerance is + 12 V +/- 10%. The power consumption is T.B.D.

6-4-5. Emergency Shut Down

Emergency shut down can turn off drivers without control of CPU.

7. MPU FIRMWARE FUNCTION

7-1. Auto current control and auto power control

Current driver provide ACC function, and parameters are set by the farmware. The procidure of APC is to tune ACC value to eliminate the difference between target value and PD monitor value measured by the farmware The purpose of APC control is mailny the correction of optical output power by changing ambient temperature, and the interval of updating data is less than 100 ms (target: 10ms).

The flollowings are the notes.

ACC/APC mode can be separately selected for each lasers. Lasers must be off when modes are changed.

Pulse mode operation is not available under APC operation,

APC value can be set to be 10 to 110% when typical APC output is defined as 100%.

The power monitor range is 0 to 400% (desing value.)

7-2. Temperature setting of TEC controller

Target temperature of TEC controller is set by firmware. The defalt value is 25 ℃.

7-3. Alarm function
The following parameters are monitored by firmware. The monitoring period is less than 1s.
Alaram signls are LED on the board.

7-3-1. Abnormal of LD curent
The alarm is generated when 25% is changed to the initial value of LD current under APC operation.

7-3-2. Abnormal of temperature
The alarm is generated when the difference between real and setting temperatures is +/- 1 ℃. This alarm is always generated when the driver turns on.

7-3-3. Abnormal of power supply
The alarm is generated when the difference of power supply is +/- 2V compared to 12 V.

8. EXTERNAL DIMENSION
Driver board size: 75mm x 75mm (TBD)

9. ACCESSOTIES
Cable to QLM4xx series, 20cm
USB cable to PC, 1m

10. NOTICE
- Handling products

Stresses at or above those listed under Absolute Maximum Ratings, and ESD may cause permanent damage to the product. Please pay attention to handling products, and use within range of maximum ratings.
QD Laser takes no responsibility for any failure or unusual operation resulting from improper handling, or unusual physical or electrical stress.

- RoHS

This product conforms to RoHS compliance related Directive (EU) 2015/863.

QD Laser, Inc.
Contact : info@qdlaser.com http://www.qdlaser.com

Address : Keihin Bldg. 1F 1-1 Minamiwataridacho, Kawasaki-ku, Kawasaki, Kanagawa Zip 210-0855 Japan