QDLASER

Operation guide for QBB0502

(Picosecond pulsed driver for visible laser module)

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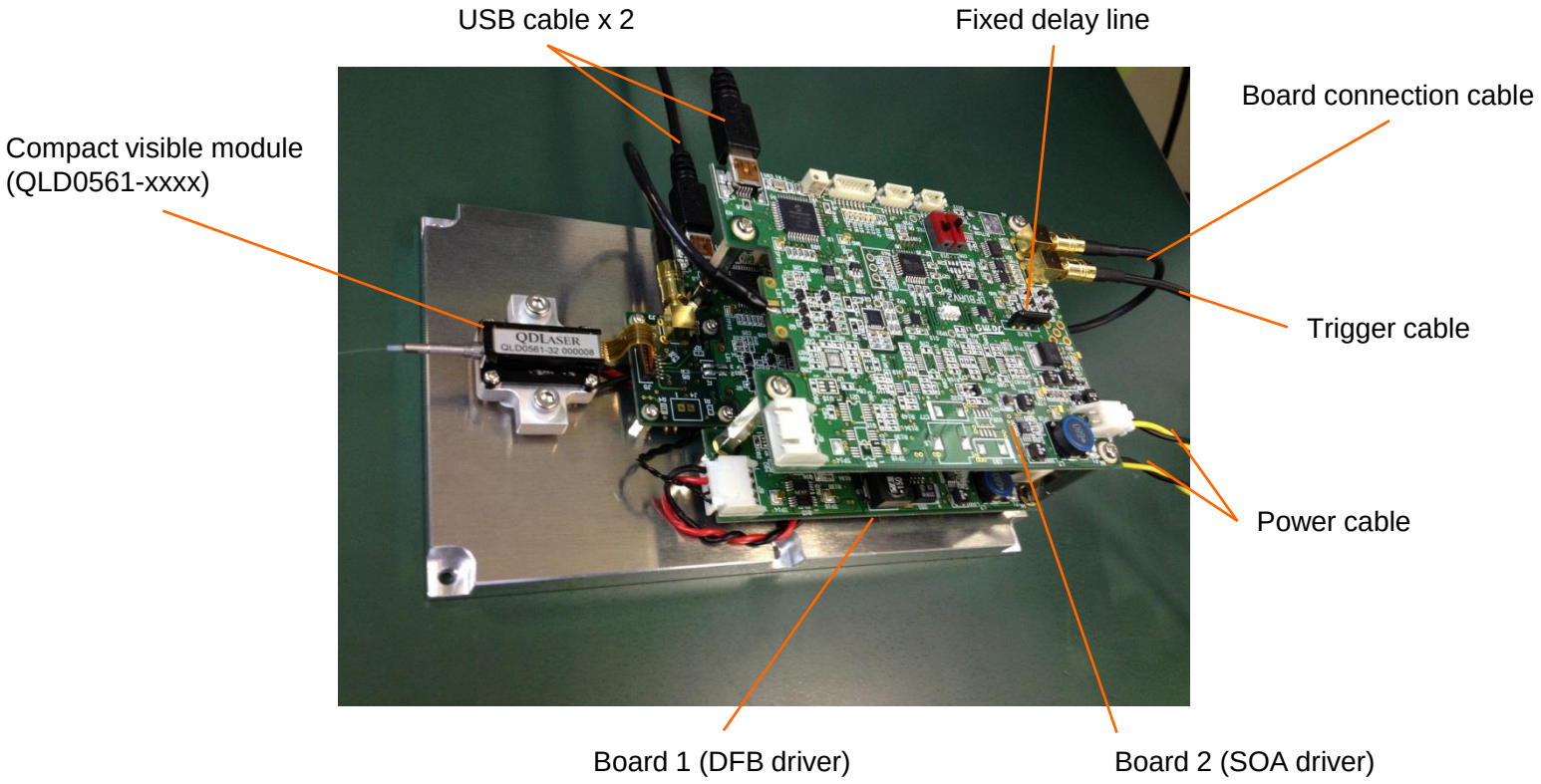
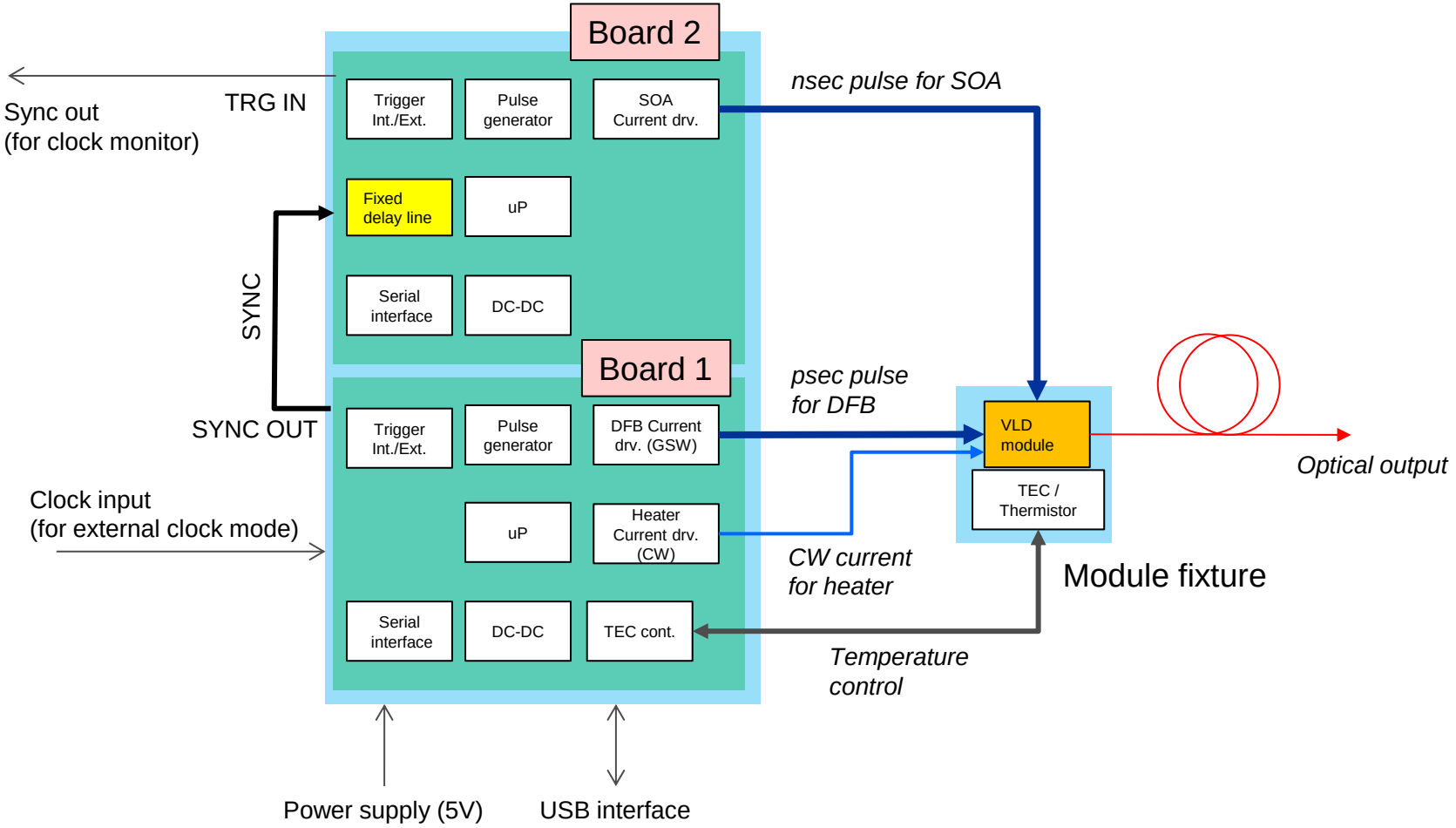
Contents

Introduction

QBB0502 is a picosecond pulsed driver board specially designed for compact visible laser module of QLD0593/QLD0561 series. Flexible and easy operation can be achieved with both external and internal trigger from single shot to 250MHz high repetition rate. All operation parameters including pulse peak current and laser diode temperature can be controlled by PC software via USB interface. Only single +5V power supply is required for the board operation.



Function block



Setting up

1. Installing application software

Use the Windows7 PC in which .Net Framework 4.0 is installed. Copy the exe file and dll file into the same folder.

Please refer the application software manual (DC0431-01) for more details.

2. Connections

1. Power supply cable

Connect the attached power cable to the each board and +5V/3A power supply. (Yellow cable: +5V, Black cable: GND)

2. USB interface

Connect the USB cable s to the each board and PC. You can use attached USB HUB for unification.

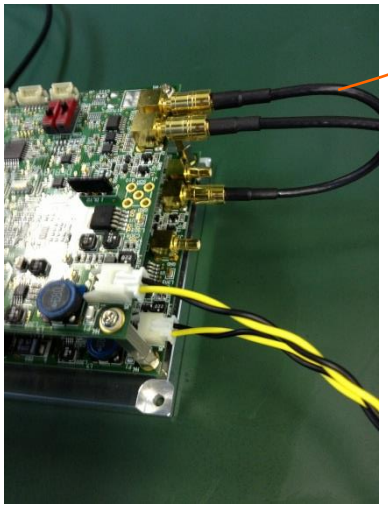
3. Board connection cable

Connect between [sync out] of board 1 and [trig in] of board 2.

4. Trigger cable

If necessary, use SMB connectors of [trig in] of board 1 or [sync out] of board 2 to communicate the operation clock with external equipment.

Board connection cable



3. Mounting the laser module

1. Connect the flexible cable to the board

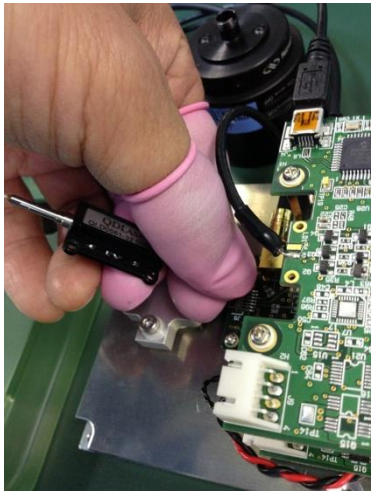
Please take great care not to damage the flexible cable and laser module when you connect the laser module to the board. Please do not pull the flexible cable from the laser module.

2. Mounting the laser module to the TEC plate

Use four screws to fix the module with screw torque of less than 0.1N.m.

3. Connect the optical fiber to your measurement equipment

Connecting the flexible cable to the board

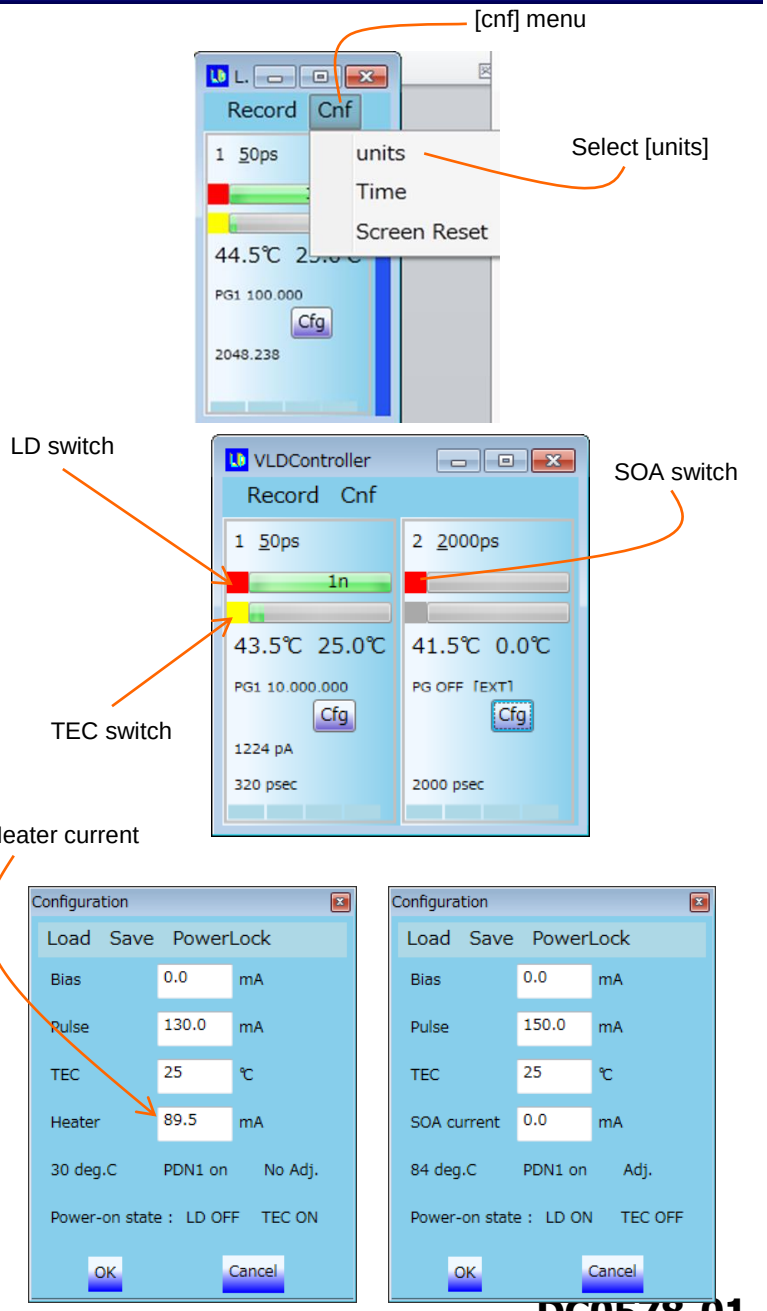


TEC plate

Turn on/Turn off the laser module

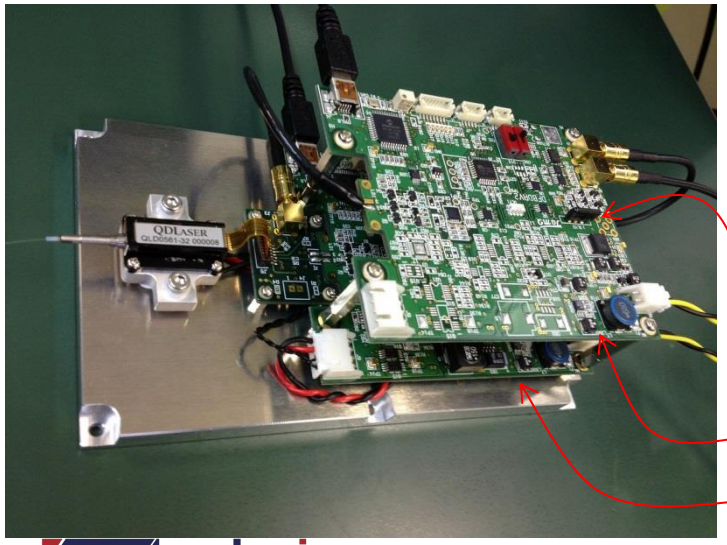
1. Turn on the laser
   1. Confirm the connection between PC and the board with USB cable
   2. Start application software (LDControl.exe) with double click the file.
   3. Turn on the power supply of +5V.
   4. Click [Cnf] menu and select [units]. Enter “2” to control two boards.
   5. Adjust the initial value to the heater current box on the configuration form. Recommended value is indicated in the document of test data. The value is different from device to device.
   6. Click [LD switch] to turn on the DFB.
      - TEC on the board 1 and SOA driver on the board 2 will turn on automatically after power on.
      - You can customize the turn on status using software setting. Please check the operation manual for more detail.
   7. Optimize the heater current to achieve highest output power.
      - Tune the heater current within the maximum ratings of 100mA.
      - Basically, you can use the recommended value (or similar value to it).
   8. Tune the other parameters

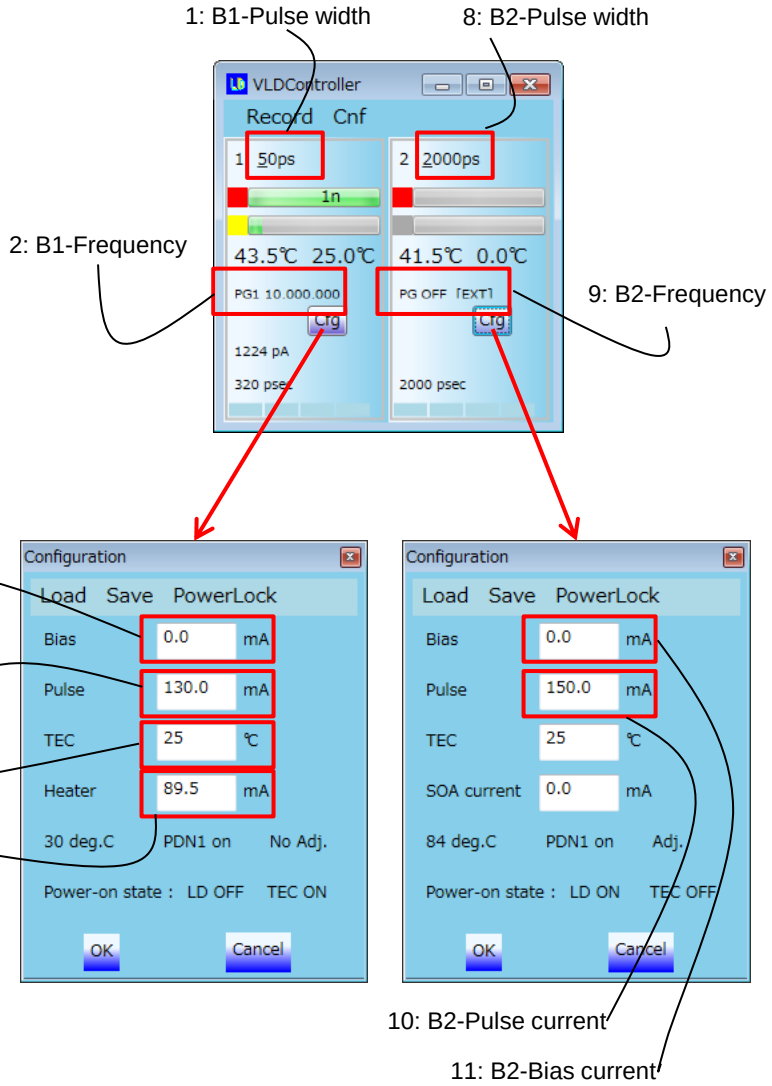
2. Turn off the laser
   1. Turn off the power supply of +5V.



Setting parameter

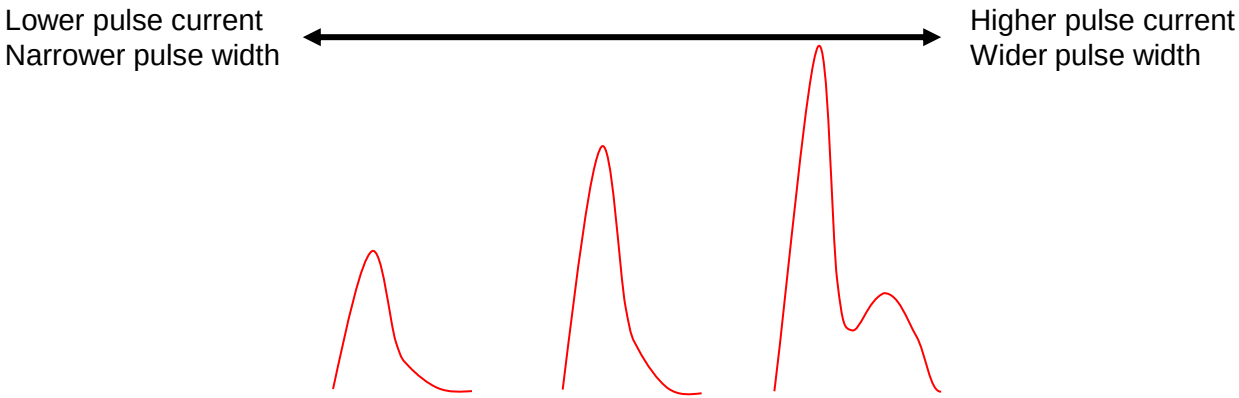
Board	Item	Value	Unit	Remark	Fig.
Board1 (DFB driver)	Hardware delay	9	nsec	FDD9010	
	Pulse width	240	psec	Select [50psec]	1
	Repetition frequeny	10	MHz		2
	Clock source	PG1		Internal clock	2
	Pulse current	130	mA		3
	Bias current	0	mA		4
	Heater current	(*)		Need to be optimized	5
	Module temperature	25	deg.C		6
Board2 (SOA driver)	Hardware delay	4	nsec	FDD4010	7
	Pulse width	2000	psec	Select [2000psec]	8
	Repetition frequeny	-	MHz		9
	Clock source	EXT		External clock	9
	Pulse current	150	mA		10
	Bias current	0	mA		11
	SOA current	-	mA	Not applicable	
	Module temperature	-	deg.C	Not applicable	





Board 1 (DFB driver)

- Repetition frequency
  - You can tune the repetition frequency with clock generator setting form of board 1.
  - You may need to optimize the driver parameter like pulse width or pulse current when you change the repetition frequency.
  - Please be noted that board 2 should be operated with external clock mode to synchronize the two boards.
- Pulse current and pulse width
  - Both pulse current and pulse width have to be optimized to achieve good gain-switched pulse shape.
  - Higher pulse current and/or wider pulse width will lead the generation of pedestal component.
  - Lower pulse current and/or narrower pulse width will lead the disappearance of the optical pulse.
- Heater current
  - There is a optimum value of the heater current to achieve the best matching condition between DFB and PPLN wavelength.
- Module temperature
  - You can control the module temperature if you need to tune the emitting wavelength slightly.
  - Please operate the laser module in the proper temperature range between 20 to 30deg.C.



Optical pulse shape

Board 2 (SOA driver)

Pulse current

- You can control the peak power of the optical output with tuning the pulse current of board 2.
- Saturation output power depends on the operation condition like pulse width of board 2.

Bias current

- If you want to operate SOA in CW mode, please use bias current. Saturation output power will become low compare to the SOA pulsed operation mode.

Hardware delay

- You can control the pulse timing with selecting the fixed delay line on the board 2.
- When you change the fixed delay line, please turn off the driver board.
- Following set of the delay line is included in the test kit.

Name	Value[nsec]	Remark
FDC1510	1.5	
FDC2010	2	
FDC2510	2.5	
FDC3010	3	
FDC3510	3.5	
FDC4010	4	Initially set on the board 2
FDC4510	4.5	
FDC5010	5	
FDD5510	5.5	
FDD6010	6	
FDD6510	6.5	
FDD7010	7	
FDD7510	7.5	
FDD8010	8	
FDD8510	8.5	
FDD9010	9	Initially set on the board 1
FDD9510	9.5	
FDD10010	10	
FDD10510	10.5	
FDD11010	11