TEC Laser Controller Manual

1 Description

TEC Laser Controller combines the laser driver and the thermo electric controller (TEC). The full featured laser system with a high quality laser diode is enclosed in a compact package.

The system delivers stable laser output power and it can operate in an auto power control (APC) mode and a constant current mode. It includes complete remote communication and it is controlled via Mini USB port.

The TEC temperature and the laser power or current all are available to be changed or monitored by the software via the USB port.

2 Electrical assignment

2.1 Power Connector

The standard power supply uses a 2.1 mm x 5.5 mm center positive standard jack. The output of the standard power supply is 3.3 V and maximum 1.2 A.

2.2 Mini USB Connector

Connect a USB cable here to transmit data from a computer.

2.3 LED

The laser controller has one LED to provide information about its status (see the following table.)

Meanings of the status LED.

Action	Meaning
Fast flashing (150 ms on / 150 ms off)	Waiting for temperature stable after power on
Slow flashing (300 ms on / 300 ms off)	Waiting for 20 seconds
Flash 1 time (200 ms on) every 2 s (LED off)	Running normally

3 Operation Instruction

The laser system can operate autonomously or be controlled via USB communication port. The status of the system is monitored on LED.

3.1 Installation

- Mount the laser controller on a proper heat sink and tighten evenly.
- Connect the USB interface cable to the USB connector if you need it.
- Connect the power supply to the power connector.

3.2 Auto start

The TEC laser controller will start automatically in the following procedure after the power supply is switched on.

- The TEC operates to reach the temperature set point. It will take a few seconds depending on the set temperature and environmental temperature. During this period the status LED keeps flashing fast.
- There will be a wait period of 20 seconds before the laser emits the radiation, and the status LED keeps flashing slowly.
- The laser controller will start to operate in a mode saved in its memory. The default is an auto power control mode. The LED flashes 0.2ms in every 2 seconds.
- For a green laser the warm up time could be around 4 minutes to get stable power.

4 Operation via USB communication port

The laser system includes complete remote control capability via USB port. After TEC laser controller auto started, communication and control can be done using commands listed in following table.

4.1 USB Virtual COM Port Driver Installation

Virtual COM port (VCP) drivers cause the USB device to appear as an additional COM port available to the PC. Application software can access the USB device in the same way as it would access a standard COM port.

The VCP drivers are available to download for free from FTDI Website (http://www.ftdichip.com/Drivers/VCP.htm).

4.2 Baud rates and serial port settings

The laser controller uses a fixed 9600 baud rate, which cannot be changed. The other serial port parameters are: 8 data bits, 1 stop bit and no parity. A hardware flow control is not supported.

4.3 Command formatting and termination characters

Each command to the controller must be terminated by a carriage return/line feed pair (ASCII 13 followed by ASCII 10).

All commands are case-sensitive.

Command arguments must be delimited by a single ‘:’ character (ASCII 58).

4.4 Handshaking

Under no circumstances the controller initiates communication. It only transmits characters in response to a message. Every message to the controller generates a response, either a numerical value or the acknowledgment string “OK”. In the event that the controller receives a message that it cannot interpret, it responds: “ERROR”. Every controller response is terminated by a carriage return/line feed pair (ASCII 13 followed by ASCII 10.)

Control commands.

	Commands	Argument	Response	Function
1	slp:	**.*	OK	Set the laser output power from 0.0 to full power(Default: Full power)

2	rlp	No	**.*	Return the laser output power in mW
3	slc:	**.*	OK	Set ACC driver current in mA
4	rli	No	**.*	Return the present operating current of the laser diode in mA
5	stt:	**.*	OK	Set the TEC temperature in degrees Celsius(Default:25 Degree)
6	rtt	No	**.*	Return the TEC present measured temperature of laser diode in degrees Celsius
7	rti	No	**.*	Return the TEC present operating current in mA
8	lon	No	OK	Turn on the laser APC driver
9	lof	No	OK	Turn off the laser APC driver
10	con	No	OK	Turn on ACC laser driver
11	cof	No	OK	Turn off ACC laser driver
12	ton	No	OK	Enable TEC control
13	tof	No	OK	Shut down TEC control
14	rsp	No	**.*	Return the present laser setting power in mW
15	rcp	No	**.*	Return the present laser full power
16	rst	No	**.*	Return the TEC set up temperature
17	rsi	No	**.*	Return the ACC set up current in mA
18	rfi	No	**.*	Return the ACC full current
19	ssc	No	OK	Save the setting to the flash memory so the laser system can operate in the same setting after repower it
20	rcm	No	**.*	Read the setting maximum laser current in mA
21	rsv	No	****	Return the laser system firmware version
22	rsn	No	*******	Return the laser controller serial number

5 Controller Software Installation

Insert the TEC control software CD into your computer and run the “Setup” file then follow the installation procedures. For the operation please refer to the software help.