PicoDrive RBLD
Quick Start Guide
6 channel laser diode driver
with 1 channel TEC driver
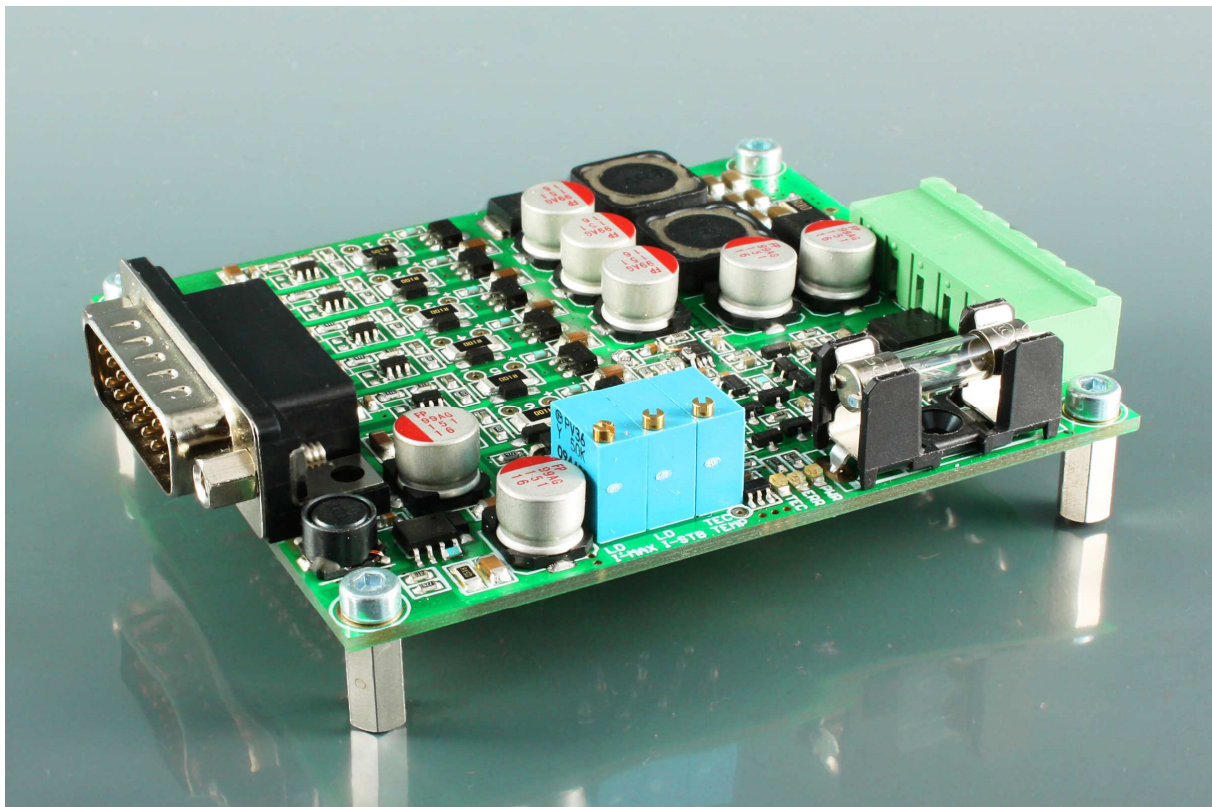

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This is a Quick Start Guide for overview only.

Please also read the whole manual for this driver.

Connection

You will find some notes on the bottom side of the PCB like supply voltage etc.

Pinout for supply and signal input/output (COMBICON)	
1	+5V
2	GND
3	+ MODULATION
4	- MODULATION
5	/ERROR OUTPUT (open coll.)
6	ENABLE INPUT

Pinout for laser diodes, TEC element and temperature sensor (D-Sub)	
1	+LD1 (anode)
2	+LD2 (anode)
3	+LD3 (anode)
4	+LD4 (anode)
5	+LD5 (anode)
6	+LD6 (anode)
7	+TEC
8	+TEMP SENS (LM335)
9	-LD1 (cathode, GND)
10	-LD2 (cathode, GND)
11	-LD3 (cathode, GND)
12	-LD4 (cathode, GND)
13	-LD5 (cathode, GND)
14	-LD6 (cathode) together with -TEMP SENS (GND)
15	-TEC (GND)
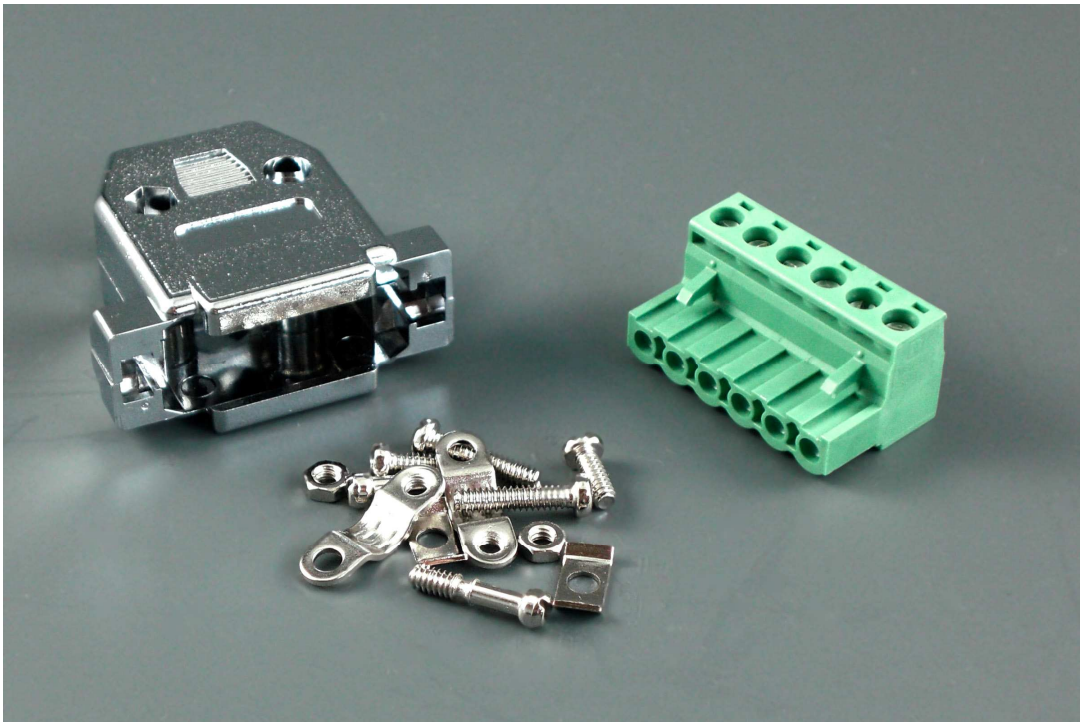
How to set the voltage for the laser diodes?

At first, you have to decide whether you use red or blue laser diodes. There are three different PicoDrive RBLD drivers available:

1) PicoDrive RBLD fixed – for use with red laser diodes
2) PicoDrive RBLD fixed – for use with blue laser diodes
3) PicoDrive RBLD variable – for use with red or blue laser diodes

All drivers are commonly available. You can check on the bottom side of the PCB, which driver you have. As the first and the second driver are fixed, you don't have to do anything in this chapter.

The third driver has an additional trimpot, which enables the user to set different driver voltages. This is very useful to lower power losses (heat!) or to quickly change from red to blue mode (or from blue to red mode). The trimpot is located in the center of the driver board. Available on request.

How to set the maximum current of the laser diodes?

Near to the D-Sub connector, you will find 6 shunt resistors. Each one has a number (1 to 6). There are test pins connected, including information about polarity. You can connect a normal multimeter in voltage mode and measure the voltages of each resistor. That's how you can check the current through a laser diode.
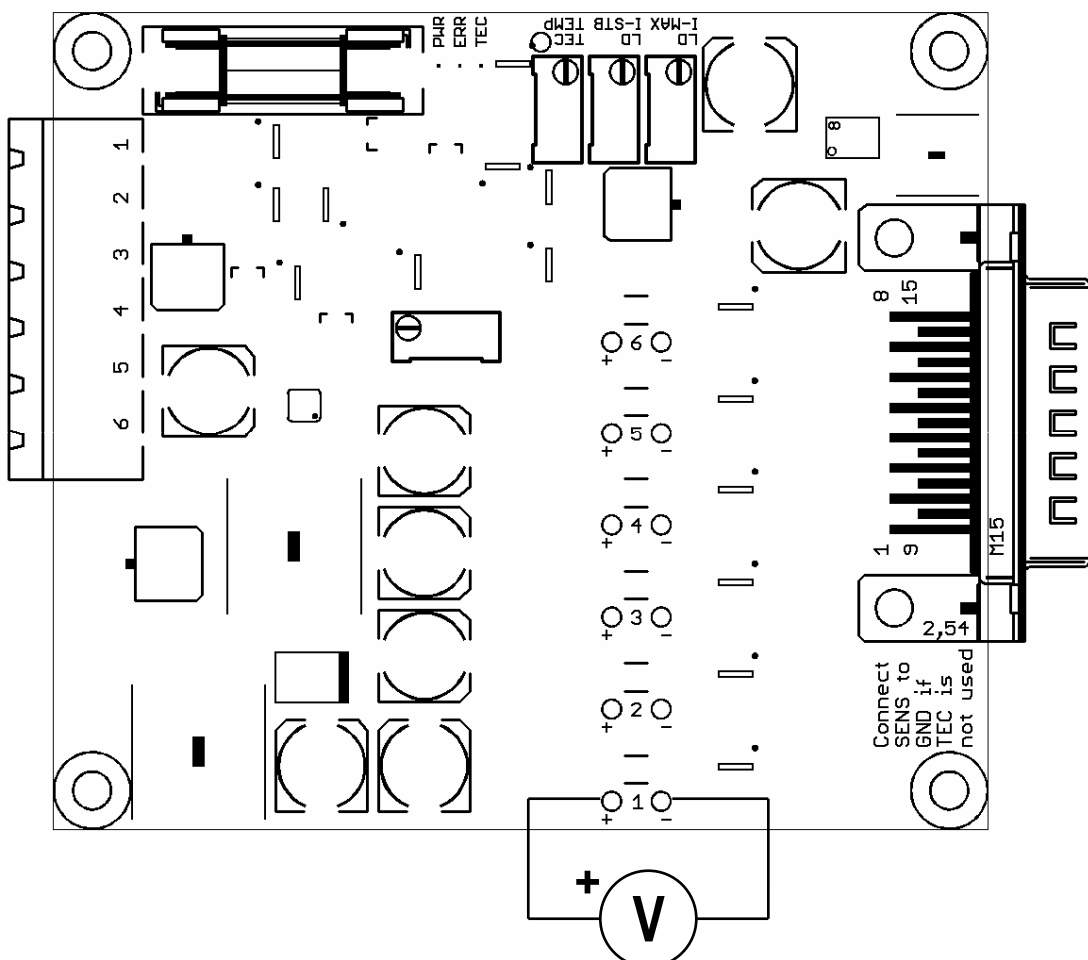
Each shunt has a resistance of 0.1 Ohm, so it's very easy to measure the current:

$$I_{LD} = U_{Shunt} : 0.1$$

To adjust the current, you need to connect at least one laser diode of course. Otherwise, you can't measure any current. For now, you can connect the **+TEMP SENS** (pin 8 of the D-Sub connector) to GND. It's for the TEC operation and overheating protection. We do this later.

Don't forget to zero all trimpots (25 turn counter clockwise), before you continue.

After you have done all this, let's try to set the current. Connect a +5V supply voltage to the driver and also to the enable input (pin 6 of COMBICON connector). Measure the voltage on the matching shunt you connected a laser diode (for example shunt 1 for laser diode on pin 1 of D-Sub connector). You should measure something around zero.

Now let's connect some modulation signal to the driver. Just connect +5V to +MOD and GND to -MOD. You should still measure a voltage around zero at the shunt.

Let's set the maximum current through the laser diode at first. After that, the current will NEVER exceed this maximum value. This is great to protect your laser diodes from overcurrent.
Slowly increase the current by turning the potentiometer **LD I-MAX** clockwise. Always keep an eye on the voltage across the shunt. If your diode needs for example 300mA, you have to set the shunt voltage to 0.030V (30mV).

Now, the maximum current is set and will never be higher, even if you turn on the standby trimpot or increase the modulation voltage above 5V.

## How to set the standby current of the laser diodes?

Let's set the standby current. To do so, set the modulation voltage to 0V. Now you can increase the standby current by turning the potentiometer **LD I-STB** clockwise. Some people adjust the standby current near to the laser level. This results in more speed and linear modulation ability. But you will have some standby beams sometimes.
If you hate that, you can decrease the standby current of course, but then your diode will be slower and starts to lase at already very high modulation inputs (about at 1-2V).

Finally, it's done! All currents of the other channels are now automatically set. Keep in mind: total current of all currents should not exceed 2.5 to 3A with this driver board.

How to set the temperature of the TEC element?

To set the temperature for the TEC, you will find another trimpot, called **TEC TEMP**. There is also a testpin, where you can measure the set voltage with a multimeter (connect negative lead of multimeter to GND).
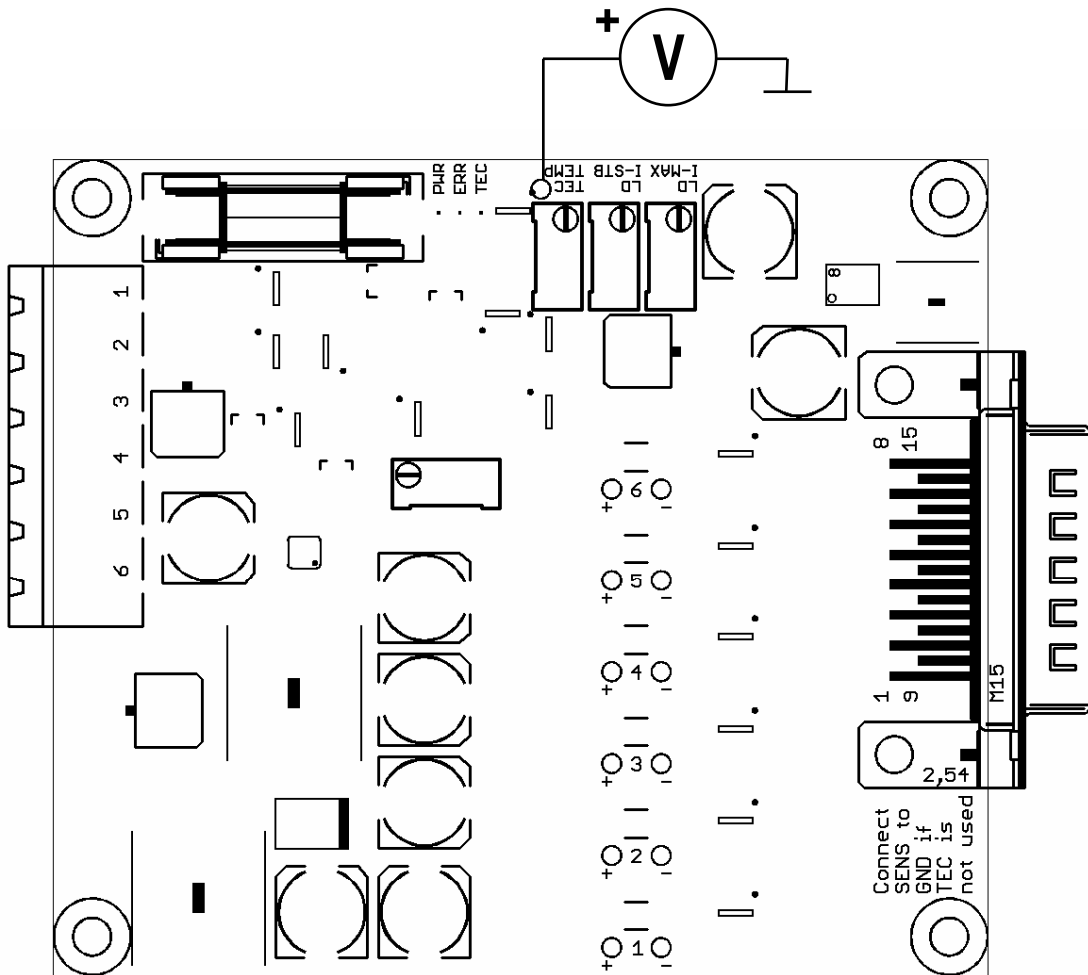
You can calculate the necessary voltage like this:
2.73V + (Temperature °C * 0.01V)

For example, you need to set the driver to 30°C:
2.73V + (30°C * 0.01V) = 3.03V

Now you can connect the LM335 and the TEC to the D-Sub connector. See above for pinout.

You can check TEC operation at the blue LED. The driver has a soft-start, soft-stop mode to protect your TEC.

Let's have some fun and enjoy your first laser show with a PicoDrive module.

Technical Data

Supply Voltage	5VDC ±5%
Supply Current	max. 8A
Fuse	10A slow blow
Modulation Input	symmetrical, analog (0-5V) 0V = no optical output, 5V = full power
Modulation Speed	Sinus: DC to 30kHz Rectangle: DC to 20kHz
Enable Input	0V = Driver off, 5V = Driver on

Laser Diode Channels	1 to 6
Laser Diode Voltage	max. 2.6V (red mode) max. 5.7V (blue mode)
Laser Diode Current	max. 1.1A per channel (total max. 3A)
TEC Voltage	fixed: 5V
TEC Current	max. 3A
TEC Channels	1
Temperature Sensor	1x LM335
Overheat Protection	yes, turning off at 38 to 40°C
Current Measurement	Shunt: 0.1Ω 1%
Trimpots 15 or 25 turn (5400/9000°)	LD I-MAX: maximum current LD I-STB: standby current Diodenstrom TEC TEMP: temperature of TEC element
Adjustable Temperature Range	adjustable with trimpot, 14°C to 33°C
Cooling	passive
Temperature Range	storage: 0°C to 60°C operation: 15°C to 35°C

Dimensions (L x W x H)	84 x 73.5 x 25mm
Drill Holes	4x 3.2mm
Drill Holes Position	77 x 66.5mm
Connectors	Supply and Signal I/O: COMBICON, 5.08mm pitch, 6-pin Laser Head: D-Sub 15-pin, 2 rows

Mechanical Data

Bohrungen:
4x 3.2mm

Dicke PCB:
1.6mm

66.50

73.50

77.00

84.00