

Uniphase / IE Optomech HYB B Laser Power Controller

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Introduction

The HYB B laser controller is a microprocessor based device that provides power and cooling control for Uniphase 43xx, 46xx and 47xx series microgreen and microblue DPSS laser heads. This is a compilation of information from several sources. Items that I'm not 100% sure about are highlighted. There are 2 boards inside the HYB B power controller. The larger (main) board is the laser diode controller and peltier (TEC) controller for the laser diode. The smaller board is a second peltier (TEC) controller for the resonator.

Main Board LEDs

LED	Color - Function	Notes
	Orange/Green – laser emission	Closest to edge of board
	Red – system power	
	Red – “SHTS”	High temperature shutdown?
	Green – TEC 1 Temperature Lock	

Peltier Board LEDs

LED	Function	Notes
D7	TEC 2 Temperature lock	

Main Board Potentiometers

VR	Function	Notes
VR1	TEC 1 Temperature Set	
VR2	Laser Diode Power Sense Gain Adjust	No effect?
VR3	Power / Current Setpoint Adjust	
VR4	Laser Power Sense Gain Adjust	Output power sense gain
VR5	Current Limit Set	0.5V/A

Peltier Board Potentiometers

VR	Function	Notes
VR1	TEC 2 Temperature set	

Main Board Connectors

This information was collected from several documents. Where the documents differed, I included the alternate descriptions in the notes column.

CON1 (DB-25) – to Laser Head

Pin	Function	Notes
1	Peltier 1 + (pump)	
2	Laser Diode Anode (+)	
3		Laser Diode Power Photodiode
4	Monitor Photodiode Cathode (-)	
5	Peltier 2 + (cavity)	
6	0VA	ground
7	Thermistor 1 (pump)	

8	Thermistor 1	
9	Peltier 2 –	
10		Shutter Sense
11		GND (solder linkable to 24V)
12	Thermistor 2 (cavity)	
13	5V	
14	Peltier 1 –	
15	Laser Diode Cathode (-)	
16	Monitor Photodiode Anode (+)	
17		-5.12V ref
18		Interlock Rtn
19		Laser Diode 2 Photodiode
20		Shutter Switching Output
21	Thermistor 2	
22		Diode 2 Anode
23		Diode 2 Cathode
24	Interlock	
25	Gnd	

CON2 (DB15) – “Outside World”

Pin	Function	Notes
1	+5V	
2	0V	
3	5.12V ref	
4	0VA	
5	Setpoint input	Overrides VR3
6	ON-Off Input	Connect to pin2 for laser on
7	Shutter Control Input	
8	Interlock +	
9	Temperature Lock	5V = locked, 0V = unlocked
10	GND	
11	RXD	RS-232
12	TXD	RS-232
13	Interlock Status	
14	On/off status	5V = off, 0V = on
15	Shutter Status	

CON3 (26 pin header) – Monitoring

Pin	Function	Notes
1	Laser Power (-1V/Watt)	
2	Laser Setpoint (1V/Watt)	
3	0VA	
4	Laser Current (0.5V/Amp)	
5	Current Limit (0.5V/Amp)	
6	Temperature Setpoint (100mV/C)	
7	Temperature (100mV/C)	
8	0VA	
9	Peltier Current (1V/Amp)	
10	MPD Output (1V/Watt)	
11	V Pelt (1)	MPD 2 (1)

12	V Diode (1)	Peltier Current 2 (100mV/C)
13	12V	
14	0V	
15	-12V	
16	Temperature Lock	Temp2
17	On/off status	Temp SP 2
18	5.12V ref	
19	-5.12V ref	
20	0V	
21	5V	
22	-15V	Current 2
23		Current limit 2
24		Mode
25	Mode in	On/off status
26	Not Connected	Shutter status

CON4 (4 pin screw terminal) – Power Input

Pin	Function	Notes
1	5V	To DIN5 pin 1 (most clockwise looking into socket)
2	GND	To DIN5 Pins 3,4
3	Vplt	Power out to Peltier Board
4	GND	Power out to Peltier Board

CON5 (6 pin header) – Expanded Control Input

Pin	Function	Notes
1	Laser Power Sense	
2	Laser Power	
3	Laser Diode Power Sense	
4	Laser Diode Power	
5	User V in	Wired to peltier board con1 -1
6	GND	

CON6 (4 pin header) – “Alternative Input Voltage”

Pin	Function	Notes
1	12V	This is an output used to power the TEC board
2	0VA	ground
3	-12V	This is an output
4	Not Connected	Actually connected to thermistor2 and wired to peltier board con1-2

Peltier Board Connectors

This information was not specified in the original documents and is inferred from specifications for the other connectors and inspection of the internal wiring.

CON1 (4 pin header) – I/O

Pin	Function	Notes
1	Thermistor	Wired to main board con5-6

2	Thermistor	Wired to main board con6-4
3	Peltier Drive +	Wired to main board con1-5
4	Peltier Drive -	Wired to main board con1-9

CON2 (8 pin header) – monitor (most pins wired to con100)

Pin	Function	Notes
1	Temperature Lock	-12V = locked, 1.4V = unlocked
2	Temperature	0.1V/degree C
3	Temperature Setpoint	0.1V/degree C
4	Peltier Current	
5	12V	Wired to main board con6-1
6	n/c	
7	0VA	Wired to main board con6-2 and con100 pin 3
8	-12V	Wired to main board con6-3

CON100 (DB9) – Shutter Control and Temperature 2 Control Monitoring

Pin	Function	Notes
1	5V	Actually connected to ground
2	Shutter Sense	Not Connected
3	0VA	Not ground?
4	Temperature 2	
5	Temperature Setpoint 2	
6	Shutter Switching Output	Not Connected
7	Shutter Sense Rtn	Not Connected
8	Peltier Current	
9	Temperature Lock	

CON3 – Power Input

Pin	Function	Notes
1	+5V	
2	GND	

Main Board Solder Link Specifications

Most of the solder links are on the bottom of the board

Link	Function	Notes
1	Processor Set Current Limit	Open
2	Processor temp set point	Open
3	Processor set point	Open
4	Control on MPD feedback	Open
5	Processor Mode Select	Closed
6	Control on Laser MPD Feedback	Closed
7	Link to Power Feedback	Closed
8	-12V inductor short	
9	5V to DC-DC Converter Inductor short	
10	12V inductor short	
11	0VA to GND link	
12	Vplt to Peltier	Closed
13	5V to Peltier	Closed
14	Select Power to RS-232	Closed
15	Select 5V RXD	Open
16	Select full RS-232 RXD	Closed
17	Select full RS-232 TXD	Closed
18	Select 5V RS232	Open
19	GND inductor for DC-DC converter short	
LK1	Mode Select	Open (close to force light feedback mode)

DB25 – HD15 Controller to Laser Head Cable (4600, 4700 heads)

HD15	Signal	DB25
1	+5V	13
2	SEEPROM CLK	
3	SEEPROM Data	
4	Monitor Photodiode Anode	16
5	Monitor Photodiode Cathode	4
6	GND	6
7	TEC 1 -	14
8	TEC 2 -	5
9	Thermistor 2	12
10	0VA (Thermistor common)	8, 21
11	TEC 2 +	9
12	TEC 1 +	1
13	Diode Anode	2
14	Thermistor 1	7
15	Diode Cathode	16

DB25 – HD15 Controller to Laser Head Cable (4300 head)

These are an older generation of Uniphase MicroGreen lasers. This pinout has not yet been verified – use at your own risk!

HD15	Signal	DB25
1	TEC 1 +	1
2	Laser Diode Anode	2
3	N/C	
4	Photodiode Cathode	4
5	Thermistor 1	7
6	TEC 1 -	14
7	Laser Diode Cathode	15
8	N/C	
9	Photodiode Anode	16
10	Thermistor 1	8
11	TEC 2 +	5
12	TEC 2 -	9
13	Thermistor 2	12
14	Thermistor 2	21
15	N/C	

DB9 on Miniature heads

These are similar to the G30.

DB9	Signal	Notes
1	Laser Diode Anode	Reverse protection diode inside head
2	Laser Diode Cathode	
3	Photodiode Anode	
4	TEC +	
5	TEC -	
6	Photodiode Cathode	
7	Thermistor	
8	Thermistor	
9	N/C	