



- Supports MOT6550xx and MOT5550xx Series modules
- Supports all module configurations
- Standalone or host-controlled
- On-board dummy laser load
- Complete evaluation and verification solution



Introduction

The MOT600_OEM board is designed to allow the user to quickly evaluate and implement a laser diode design based on the MOT6550xx and MOT5550xx-series laser driver module families. All module configurations are supported – CA, CC, GA and GC.

The board is fully populated and ready to be used in your system. It can be used standalone, utilizing on-board potentiometers to set output current/power or host controlled.

Connection points are provided which can be used for monitoring system parameters such as diode current and module temperature.

Various control signals are also accessible, including output current control voltage and reset/shutdown functions, making it viable to connect to a host control system, further simplifying system development.

This User’s Guide describes the various functions of the board, how to set it up and how to use it to evaluate your system.

Please also refer to the appropriate Module datasheet for further description of the module functionality.

Available Part #s: For GA configurations replace GC with GA in part numbers.

Part #	Max. Output Current	Power Supply
MOT600_25GC_CC*	250mA constant current GC laser driver OEM board	Single
MOT600_50GC_CC	500mA constant current GC laser driver OEM board	Single
MOT600_100GC_CC	1000mA constant current GC laser driver OEM board	Single
MOT600_25GC_CP*	250mA dual mode GC laser driver OEM board	Single
MOT600_50GC_CP	500mA dual mode GC laser driver OEM board	Single
MOT600_100GC_CP	1000mA dual mode GC laser driver OEM board	Single



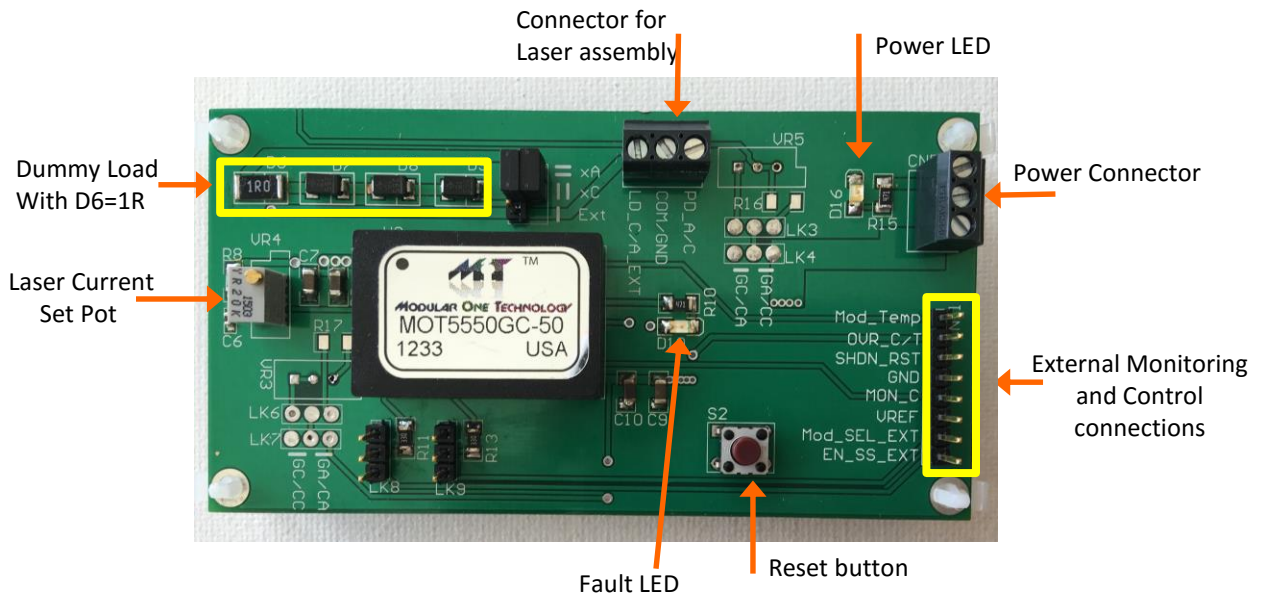
Before applying power to the OEM board please ensure all jumpers are configured correctly! (see following pages)



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Component Identification





Configuration Links

Various modes of operation, as well as setup for the particular module in use, are set with jumpers attached to the link pins. Descriptions of the function of each link are covered in the following paragraphs.

The default link positions are as shown in the following table:

Link	Function	Default	Alternate	Page Reference
LK5*	Load config	Internal (GC, CC)	Internal (GA, CA)	p4
LK8	Enable	Enabled (no link)	Standby (V_{CC})	p10
LK9	MODE	Constant Current (no link)	Constant Power (V_{CC})	p6

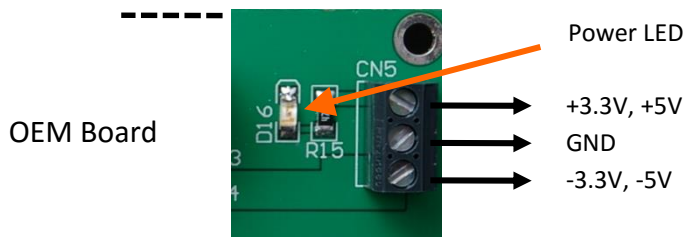
- By default the OEM board is shipped configured for the module on board.

For reference the default link settings for each module configuration are shown in Appendix 1

FUNCTIONAL DESCRIPTIONS

Power Supply

An appropriate power supply should be connected to CN5. All modules require a positive (V_{CC}) supply connection, a negative supply (V_{EE}) is also required for CA, CC and GA modules. For GC modules no negative supply is required. The power supply should be capable of sourcing sufficient current as shown in the datasheet for the module being used, plus an additional 15mA for the current drawn by the indicator LEDs. The supply voltage may be anywhere in the range from 3.3V to 5V nominal. When dual supplies are used the voltages should be symmetrical. When supply voltage is applied the power LED, D16, will illuminate green.



Important Note:

For dual supply modules positive supply should be applied first, then negative supply. Also, for switch off, remove negative supply first then positive supply.

If the positive supply is removed and the negative supply remains powered, excessive current consumption may occur. (since the control circuitry is powered from the positive supply)

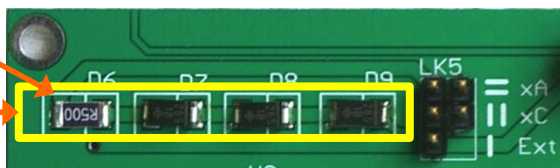


Laser connection

For quick initial evaluation the on-board dummy load can be used in place of a real laser. The dummy load consists of 3 series-connected diodes and a resistor, which approximate to an actual laser diode. Link LK5 is used to ensure the correct polarity for the module configuration being used. In this configuration only Constant Current mode can be used (see LK9) since there is no feedback mechanism for measuring power.

Dummy Load Resistor = 1R
(Can be used to measure output current)

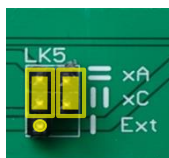
Dummy Load



The correct settings for LK5 are as shown:

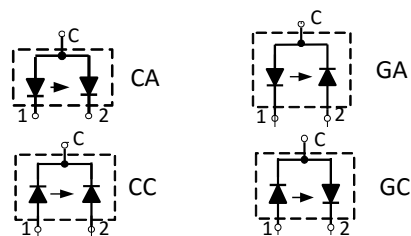
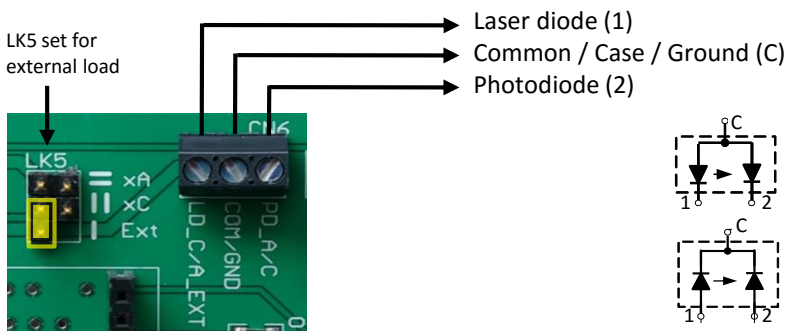


CA, GA Modules



CC, GC Modules

For use with a real laser assembly LK5 is adjusted as shown, and 3-pin laser assemblies can be directly connected to CN6:



Be sure that the laser assembly configuration matches the module configuration

Notes: For 4-pin lasers just connect to CN6, observing the correct polarity of the laser diode and photodiode according to the module config being used.
For 2-pin lasers leave the PD_A/C pin open, and observe correct laser polarity according to the module config being used. (For 2-pin lasers LK9 should be set to the default, Constant Current mode position)



Operating Mode

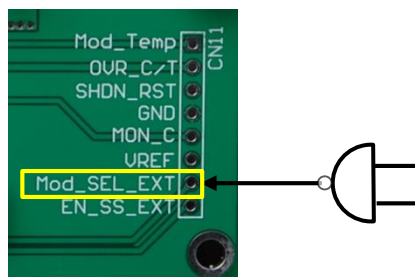
The MOT6550xx can be operated in either Constant Current or Constant Power modes. Selection of mode is accomplished using LK9, by default LK9 is set to the CC / External position. The module can be forced into the CP mode, by simply moving the jumper on LK9:



CC / External



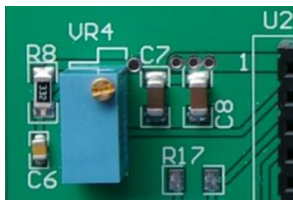
CP Mode



Alternatively, Mode control can be set by an external system. With the link in the CC/External position the control line can be accessed via Mod_SEL_EXT at CN11. This node should be pulled high for Constant Power mode, and released, or pulled down, for Constant Current mode. *(an internal pull-down inside the module sets Constant Current as the default mode).*

Laser Current / Power Setting

Control of the laser output power (in Constant Power mode) or current (in Constant Current mode) is accomplished by adjusting VR4. This applies a control voltage to the module in the range 0 – 2.0V.



Note: In some applications it may be desirable to derive the control voltage from the Vref output, or from an external DAC. See appendix 3 for information on modifying the EVM for these situations.



Constant Power Mode (MOT6550xx Modules only)

In Constant Power mode a real laser should be attached to the MOT600_OEM using CN6 connector. Power supply to the MOT600_OEM must be turned off at this time.

Important note:

Before connecting a laser to MOT600_OEM make sure that the laser maximum current rating is compatible with the laser driver module you are using. Always use a laser with current rating greater than the laser driver module. Applying current greater than the laser maximum rating shall destroy the laser permanently.

Before attaching the laser, set VR5 to its maximum (fully anti-clockwise), and set LK5 to external. Place LK3 for using on-board pot (VR5). (LK4 has been replaced with a resistor appropriately for the on-board module).

Connect the laser to CN6 making sure correct terminals have been identified and connected according to the module being used. Following is an example for GC modules:

- LD_C (laser cathode) = GND (CN6 PIN 2)
- LD_A (laser anode) = LD_C/A (CN6 pin 1)
- PD_A (photodiode anode) = GND (CN6 PIN 2)
- PD_C (photodiode cathode) = PD_A/C (CN6 pin3)

Important note:

Lasers must be handled by qualified personnel having full understanding of laser safety principles and procedures.

Connect the laser pigtail optical connector to a suitable optical power meter. The power meter must be capable of handling high power if you are using high power lasers.

1). Set the mode to constant current (CC) using LK9 and set VR4 for minimum current (fully clockwise).

Turn on the power supply to the MOT600_OEM. Increase the laser current using VR4 (turning anti-clockwise) - by increasing the voltage at the LD_SET pin. The optical power meter should now be reading corresponding power and increasing as the LD_SET voltage is being increased. Set LD_SET to approximately 1.75V and note optical power as well as the laser current for this LD_SET value.

2). Change the mode to constant power mode using LK9. You will notice that the laser current as well as the laser power decreases. Increase the laser current (power) using VR5 (turn clockwise) until laser power reaches approximately 1dB less than the power you noted in step 1.

3). If you wish to keep this module together with this EVM board and laser / photodiode setup: The ohmic value of VR5 can optionally be measured (Between PD A/C and pin1 of LK3), and a resistor having the closest value to VR5 can now be placed for R16. (This is more stable than the VR5 pot). When using R16, LK3 should be replaced accordingly to link terminals 2 and 3.

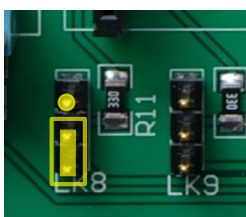
The laser power can now be changed using VR4 (LD_SET). It is now possible to change mode from CC to CP and vice versa with only minimal transients.



Module Enable

By default the module will power up when a supply is connected since an internal pull-down resistor will hold EN_SS at a low level. With the jumper on LK8 in the default position the module can be shutdown by applying a high logic level to the EN_SS pin on CN11. If the jumper is moved to the alternate position the module will go into standby until the jumper is removed or restored to the default position.

Once the module is enabled an internal softstart circuit will ramp up the output current gradually until the programmed output current value is reached.



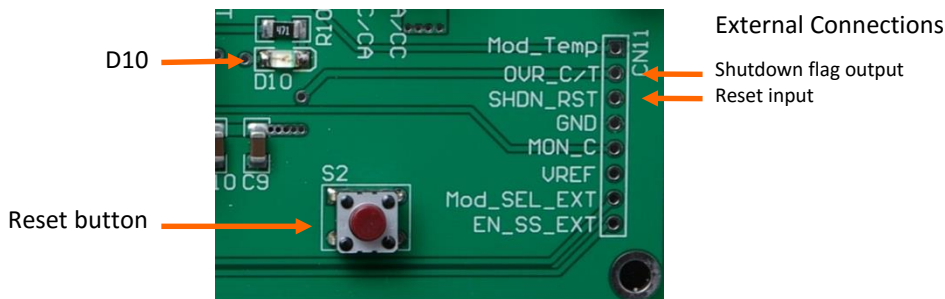
- LK8 Default
- Module starts when power applied
 - Module can be shut down if high logic level applied to EN_SS on CN11



- LK8 Alternate
- Module in standby
 - Remove link to enable module

Shutdown functionality

If over-current or over-temperature conditions are detected the module will shutdown and D10 will illuminate red. The module will remain shutdown until reset by pressing S2. If the fault conditions have been cleared the module will resume operation after performing a soft start. If a fault persists the module will not restart and D10 will illuminate once more when S2 is released.



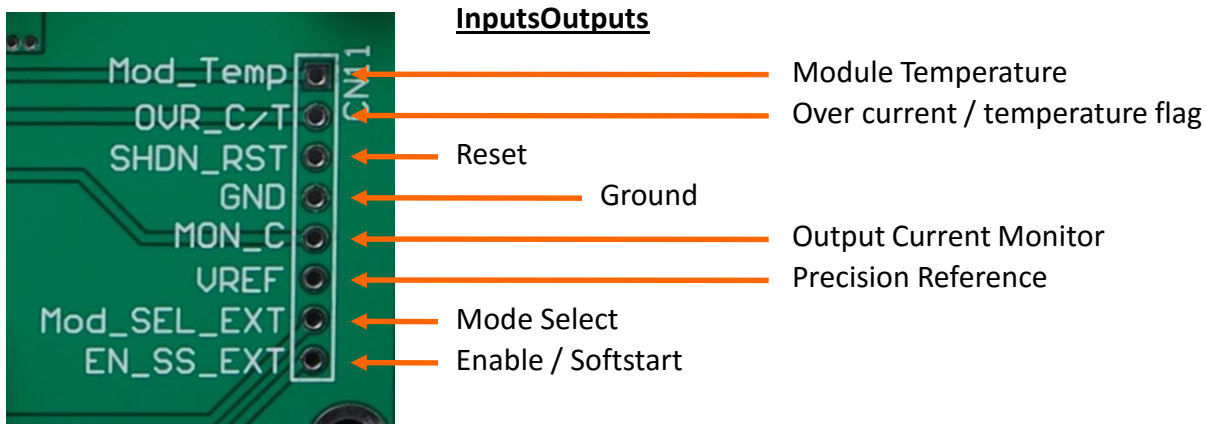
The shutdown functionality can also be monitored and restarted externally:

1. In shutdown the OVR_C/T connection on CN11 will be pulled low.
2. A reset can be initiated by pulling the SHDN_RST pin on CN11 low



External Monitoring and Control

A number of system parameters are available for monitoring, along with several control signal inputs, which would be used when the laser driver module is connected to a host controller. For convenience these are grouped together on CN11.



Module Temperature

An analog voltage representing the internal temperature of the module (0.744V = 25 C)

Over Current / Temperature flag – see “Shutdown Functionality”

This pin is pulled low when a fault has caused shutdown.

Reset– see “Shutdown Functionality”

Pull this pin low to reset the device

Output Current Monitor

An analog voltage representing laser current. Values from 0 – 2.6V correspond to output current from zero to the specified maximum..

Precision Reference

A 2.5V reference voltage, stable over temperature and voltage.

Mode Select – see “Operating Mode”

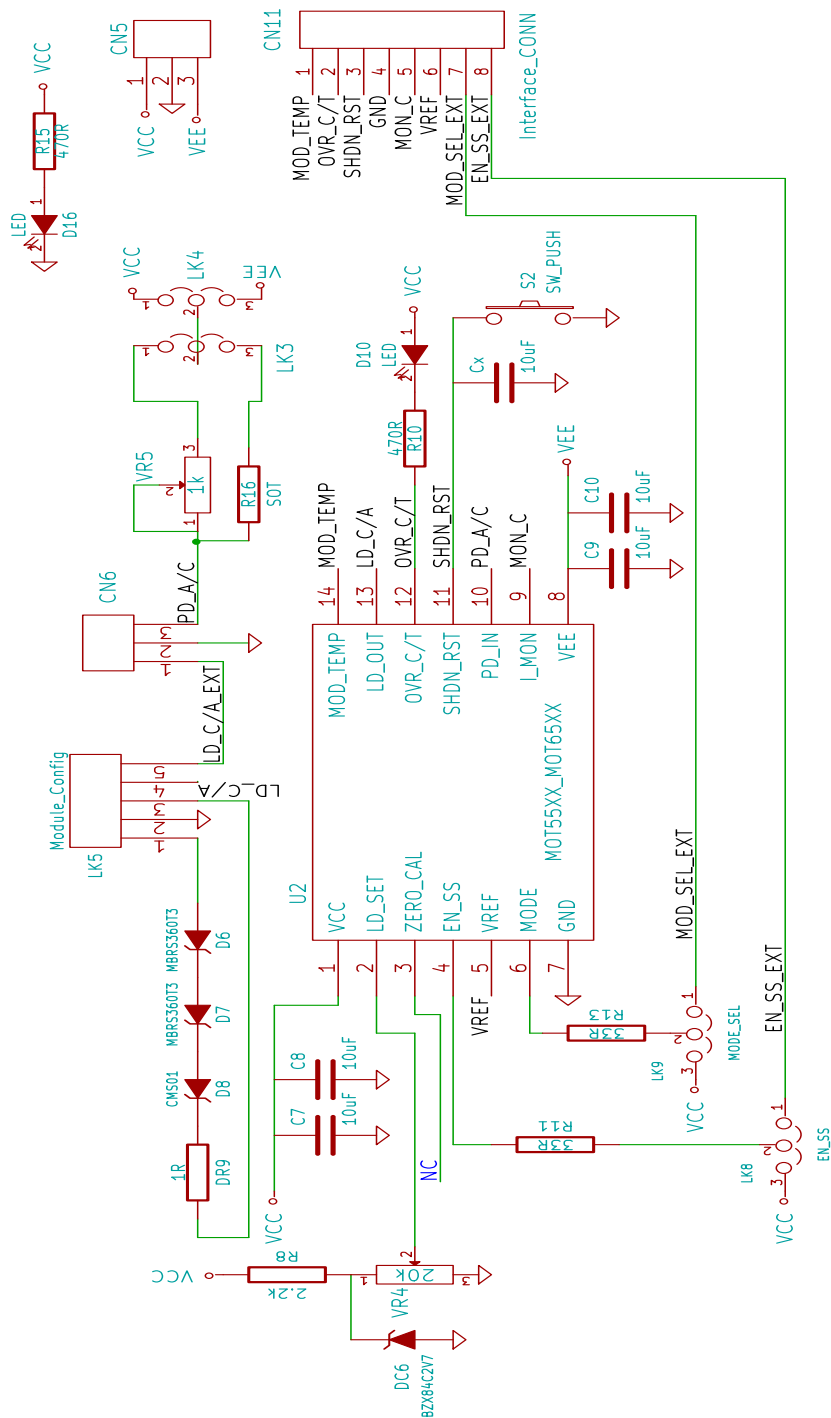
A low level sets Constant Current mode, a high level sets Constant Power mode.

Enable / Softstart– see “Module Enable”

By default this pin is at a low level which enables the module. When taken high the the module will go into standby.



Appendix 1 – Board Schematic





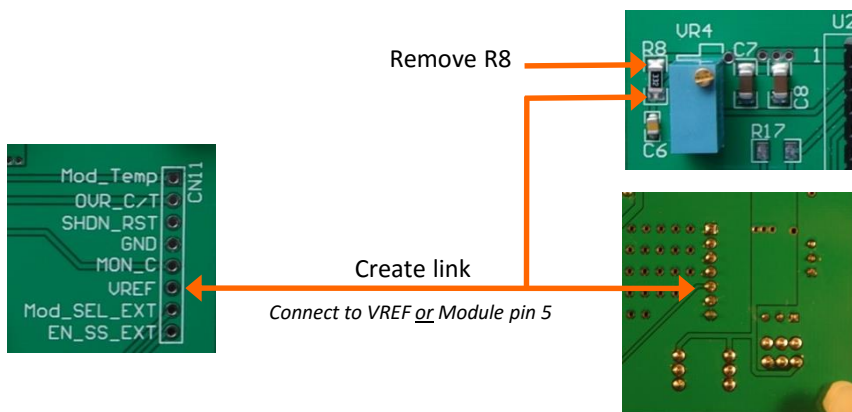
Appendix 2 – Laser Current Setting Alternate Configurations.

The standard OEM board uses a simple potentiometer referenced to the on-board VCC to derive the Laser current control voltage, LD_SET.

Using VREF output

The MOT6550xx and MOT5550xx modules feature an on-board precision reference which offers improved stability over variations in supply voltage and/or temperature. If desired the board may be modified to utilize this feature:

1. Remove R8
2. Create a link from the lower R8 pad to module pin 5, or VREF on CN11

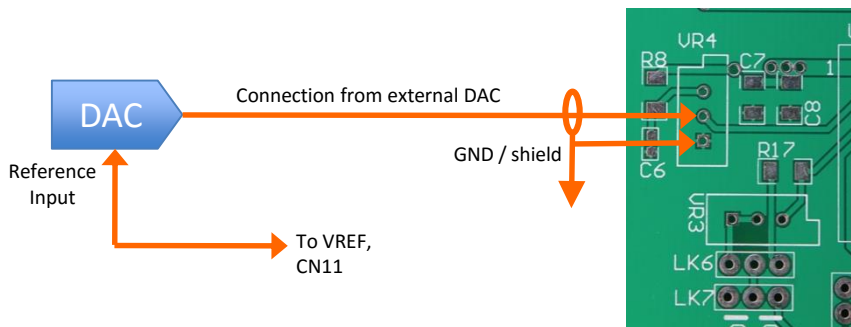


Using an External DAC

When using with a host control system the laser current may be set with an external DAC.

The VREF output may also be used as the reference voltage for the DAC.

1. Remove VR4
2. Connect the output from the DAC to the pad shown. The adjacent pad is GND and a shielded connection is recommended to avoid noise pickup.
3. If desired connect VREF on CN11 to the DAC reference voltage input.





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