



- Combo OEM
- Supports all variants of MOT6550 and MOT5550 Series laser driver modules
- Supports MOT7000 & MOT7001 and MOT3000 Series TEC Controller modules
- Includes power supply sequencing circuit for the dual supply laser drivers.
- Standalone or host-controlled
- On-board dummy laser load
- Complete evaluation and verification solution



Introduction

The MOT6701-OEM is a combo board comprising both a laser driver OEM similar to MOT600_OEM and a MOT705_OEM. It is therefore well suited to evaluate systems comprising temperature controlled laser assemblies.

MOT6701_OEM includes a power supply sequencing circuit enabling safe operation of the dual supply laser drivers. It has higher density copper with good heat sinking ability, therefore recommended for 500mA and 1A laser drivers. Both the TEC controller and the laser driver sections function independently and can be used separately as well.

For your convenience the power supply connections are shared between both constituent OEMs.

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

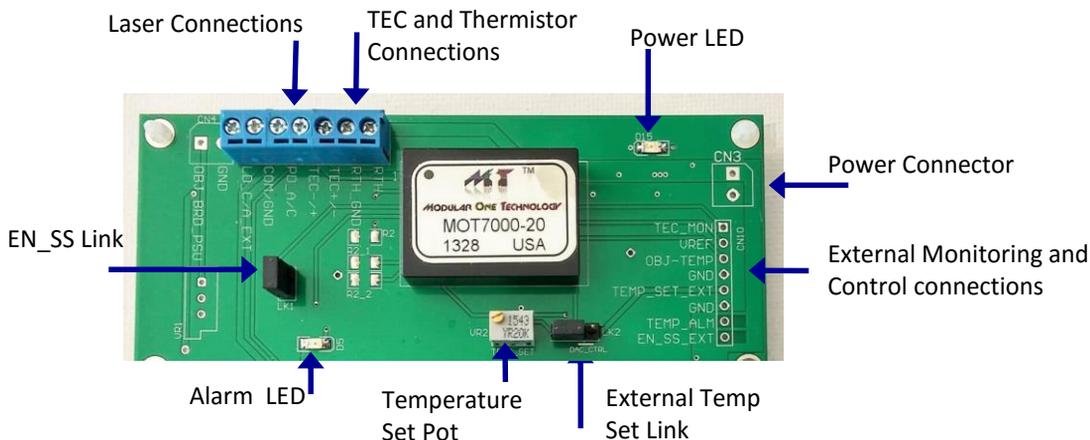


Before applying power to the OEM please ensure all jumpers are configured correctly! (see following pages)



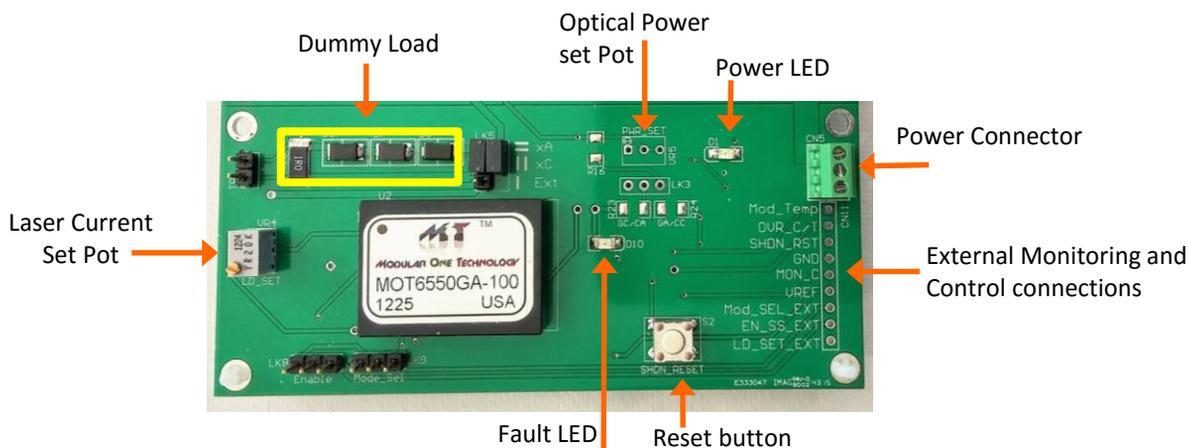
TEC Controller section:

This section is similar to the MOT705_OEM and MOT701_OEM. Please refer to the user guide of these OEMs for more detail.



Laser Driver section:

This section is similar to the MOT600_OEM with the addition of power sequencing and some other enhancements; including 2oz copper for better heat dissipations, added LD_SET_EXT pin to the interface connector, and using reference voltage to set the laser current for robust stability and lower noise performance.





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
LK1	TEC controller Enable/disable	Enabled/ External	Disable (GND)
LK5*	Load config	Internal (GC, CC)	Internal (GA, CA)
LK8	LD Enable	Enabled / External	Standby (V_{CC})
LK9	LD MODE	Constant Current /External	Constant Power (V_{CC})

- **With LK8 and LK9 left open circuit – The module is in an ENABLED, CONSTANT CURRENT configuration due to module pull-down resistors.**

FUNCTIONAL DESCRIPTIONS

Power Supply

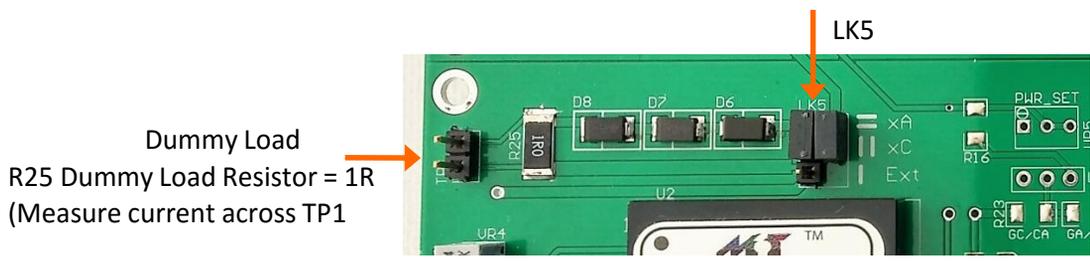
An appropriate power supply should be connected to CN3 or CN5. CN3 and CN5 are connected on board. If dual supplied are required then CN5 must be used. All modules require a positive (V_{CC}) supply connection, a negative supply (V_{EE}) is also required for CA, CC and GA modules. For GC modules no negative 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, D1 & D15, will illuminate green.

Note: For dual supply modules a sequencing circuit is used so that any supply (positive or negative) could be applied or removed first.



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.



The correct settings for LK5 are as shown:



GA & CA



GC & CC



Eternal Laser

Operating Mode

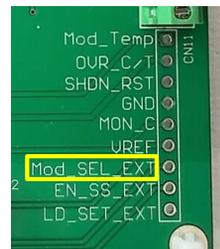
The MOT6550xx can be operated in either Constant Current or Constant Power modes. Selection of mode is accomplished using LK9, by default LK9 is set to the CC / External position. The module can be forced into the CP mode, by simply moving the jumper on LK9:



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 CP mode) or current (in CC mode) is accomplished by adjusting VR4. This applies a control voltage to the module in the range 0 – 2.0V.

Constant Power Mode (MOT6550xx Modules only)

In Constant Power mode a real laser should be attached to the MOT6701_OEM using CN6 or CN8 connector. Power supply to the MOT6701_OEM must be turned off at this time.

Important note:

Before connecting a laser to MOT6701_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). R23 is installed for GC & CA modules. R24 is installed for GA & CC modules.

Connect the laser to CN8 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 (CN8 PIN 2)
- LD_A (laser anode) = LD_C/A (CN8 pin 1)
- PD_A (photodiode anode) = GND (CN8 PIN 2)
- PD_C (photodiode cathode) = PD_A/C (CN8 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 MOT6701_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 OEM 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_EXT 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 (no link)
- Module can be shut down if high logic level applied to EN_SS_EXT on CN11

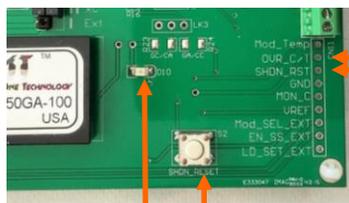


LK8 Alternate

- 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.



D10 Reset button

External Connections

- Shutdown flag output
- Reset input

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 TEC controller & laser driver modules are connected to a host controller. For convenience these are grouped together on CN10 and CN11. The functions are indicated next to each pin for convenience.

Laser driver CN11



TEC controller CN10



Laser driver Interface Pin descriptions (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.

SHDN_Reset– see “Shutdown Functionality”

Pull this pin low to reset the device

Output Current Monitor (MON_C)

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.

LD_SET_EXT

An analog voltage ranging from 0-2V sets the laser current from ~0mA to the specified maximum for each module.



TEC controller Interface Pin descriptions (CN10):

Current Monitor (TEC_MON)

An analog voltage representing the output current to the TEC.

VREF

Reference voltage output (1.5V).

Object Temperature (OBJ_TEMP)

An analog voltage representing the temperature of the object being monitored.

Temperature Set Voltage (TEMP_SET_EXT)

An analog voltage to set the object temperature. Values from 0 – 1.1V may be applied.

Note: The actual “usable” range of voltage will be somewhat less according to the desired set temperature and module characteristics – see MOT700x data sheet.

Temperature Alarm (TEMP_ALM)

This pin is pulled low when the temperature falls outside a +/-1.5° C window.

Enable / Soft start (EN_SS_EXT)

A low level voltage puts the module in standby. When releases the module resumes normal operation.

Selection Table:

Part #	Max. Output Current	Power Supply
MOT6701_2525GC*_CC**	250mA constant current GC laser driver and ±2.5A TEC controller OEM board	Single
MOT6701_2550GC_CC	500mA constant current GC laser driver and ±2.5A TEC controller OEM board	Single
MOT6701_25100GC_CC	1000mA constant current GC laser driver and ±2.5A TEC controller OEM board	Single
MOT6701_3525GC_CC	250mA constant current GC laser driver and ±3A TEC controller OEM board	Single
MOT6701_3550GC_CC	500mA constant current GC laser driver and ±3A TEC controller OEM board	Single
MOT6701_35100GC_CC	1000mA constant current GC laser driver and ±3A TEC controller OEM board	Single

* For different variants of laser configurations, such as GA, CA, or CC, replace GC with your require laser configurations.

** For dual mode versions replace CC (constant current) to CP.

e.g. dual mode version of MOT6701_2525GC_CC will be MOT6701_2525GC_CP.



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