- Supports MOT700x and MOT3000-25 TEC Controller modules
- 3V or 5V operation
- Standalone or host-controlled
- Includes modules and ready to use
- Fully RoHs compliant

Part #	Descriptions
MOT702_20TEC	Dual ±2A TEC controller OEM Board, uses MOT7001-20
MOT702_25TEC	Dual ±2.5A TEC controller OEM Board, uses MOT3000-25
MOT702_30TEC	Dual ±3A TEC controller OEM Board, uses MOT7001-30

Introduction

The MOT702_OEM is designed for applications requiring two or more TEC modules in their systems. It uses two modules on the same board size as a single module.

A single connector (CN2) accommodates all the necessary pins to drive two TEMs.

A second connector (CN10) have all the monitoring and control signals to interface to a micro-controller.

The MOT702_OEM can be used standalone utilizing on-board potentiometers to set target temperature. Connection points are provided which can be used for monitoring object temperature, output current and temperature alarm status, as well as providing external control of temperature and module enable functions.

Please also refer to the MOT700x nad MOT3000-25 series datasheet for further description of the module functionality.
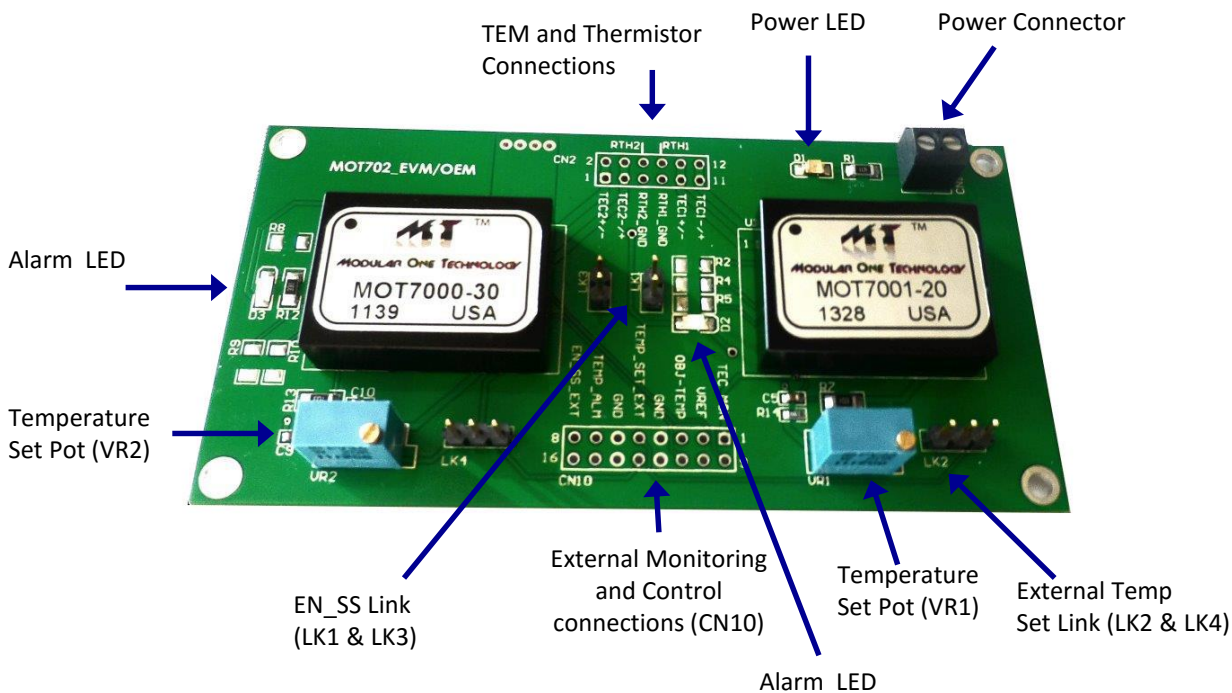
Before applying power to the OEM please ensure that jumpers are set and that VMAX is limited if required for your TEC. (see following pages)

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Contents

Component Identification

Quick Start

1. Verify the jumper settings:

    LK1 & LK3: Leave open to enable the modules

    LK2 & LK4: In the default position uses VR1 & VR2 to set temperature. Only move to the optional position if an external control voltage to be used.

3. Add R2 & R8 if necessary (default is open for maximum output voltage).

4. Add R4 & R9 if necessary (default is open for maximum negative current).

5. Add R5 & R10 if necessary (default is open for maximum positive current).

6. Connect the TEC and thermistor and/or Object Board.

7. Attach the power supplies *(be sure to observe correct polarity – see below)*

8. Go!

Note: The Alarm LED will light until the object temperature reaches the set value at which time the LED will go out – typically within 30 seconds

FUNCTIONAL DESCRIPTIONS

Power Supply

An appropriate power supply should be connected to CN1. The supply voltage may be from 3.3V to 5V as required. When supply voltage is present D1 will illuminate green.
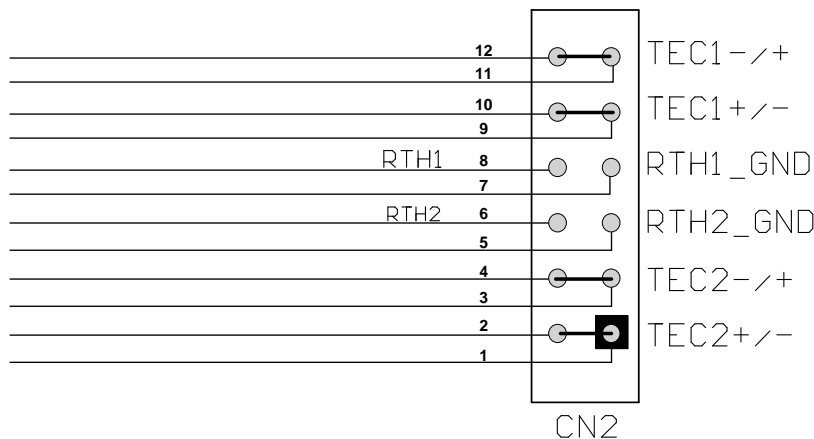
OEM Board

+3.3V, +5V   GND
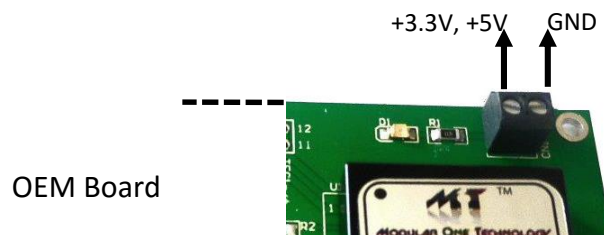
TEC & Thermistor Connections

The TEM is connected via CN2. A temperature feedback thermistor connected to the object being controlled is also connected to CN2.

If the MOTEVM_OBJ board is being used the thermistor is already installed on the board.

```
                                  12  ○──○  TEC1−/+
                                  11
                                  10  ○──○  TEC1+/−
                                   9
                           RTH1    8  ○    ○  RTH1_GND
                                   7
                           RTH2    6  ○    ○  RTH2_GND
                                   5
                                   4  ○──○  TEC2−/+
                                   3
                                   2  ○──■  TEC2+/−
                                   1
                                     CN2
```

Maximum Output Voltage

By default the MOT702_OEM ships with the VMAX_SET pin open, resulting in maximum output voltage swing. In some applications it may be desired to reduce the maximum voltage and this can be accomplished by the addition of a single resistor, R2 for module 1 and R8 for module 2. *See the MOT700x data sheet for calculating values for R2 and R8.*

Maximum Output positive & negative currents

By default the MOT702_OEM ships with the IMAXP_SET & IMAXN_SET pin open, resulting in maximum output currents. In some applications it may be desired to reduce the maximum currents and this can be accomplished by the addition of resistors, R4, R5 and R9, R10 for module 1 and module 2 respectively.

⚠️ *Be sure to observe the correct polarity for connections to the TEC.*

To verify TEC polarity monitor the voltage on the RTH terminal and the center pin on LK2 & LK4 (V_{TEMP_SET}). The voltage at RTH should be moving towards V_{TEMP_SET}. If it is moving away, towards 0V or 3V, then the connections are reversed.

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Module Enable

By default the module will power up when a supply voltage is applied (an internal pull-up means the pin may be left open for normal operation). If it is desired to disable the module the EN_SS pin should be connected to GND, which can be accomplished by closing LK1 & LK3. When these links are removed the modules will perform a soft start and resume operation.

The EN_SS signal line is also available on CN10 if external control is required (LK1& LK3 must be open in this case).

Temperature Setting

The required object temperature can be adjusted by means of VR1 & VR2. LK2 & LK4 should be set to the default position for this mode.

LK4 (default)   LK2 (option)
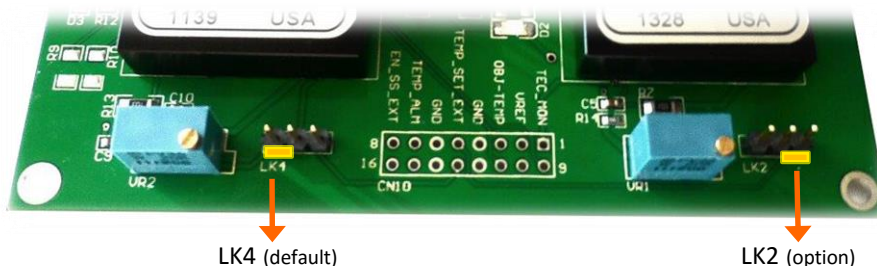
Alternatively the object temperature can be set by an external voltage applied to TEMP_SET_EXT on CN10. Pins 1 to 8 on CN10 connect to module 1 (U1) and pins 9 to 16 connect to module 2 (U2). The reference voltage, VREF, is also available on CN10 and can be used as a reference for an external DAC. In this mode LK2 & LK4 should be altered to the optional position.

Notes: Refer to the MOT700x data sheet for relationship between control voltage and object temperature.
If no control voltage is applied to TEMP_SET_EXT internal biasing will set the temperature to approximately 25˚C.

Temperature Alarm

Internal circuitry monitors the object temperature and will set an alarm flag when the temperature deviates by more than +/- 1.5˚ C. D2 (for module 1) & D3 (for module 2) will illuminate red when the alarm is set. The alarm status can also be monitored via TEMP_ALM at CN10.

Once the temperature returns to within limits the flag will automatically reset (D2 & D3 will go off).

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 modules are connected to a host controller. For convenience these are grouped together on CN10.

Current Monitor

An analog voltage representing the output current to the TEM.

VREF

Reference voltage output (1.5V).

Object Temperature

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

Temperature Set Voltage

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.
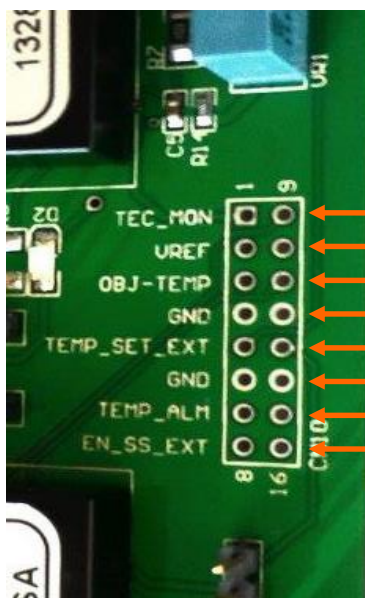
Temperature Alarm

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

Enable / Soft start

A low level voltage puts the module in standby. When releases the module resumes normal operation.
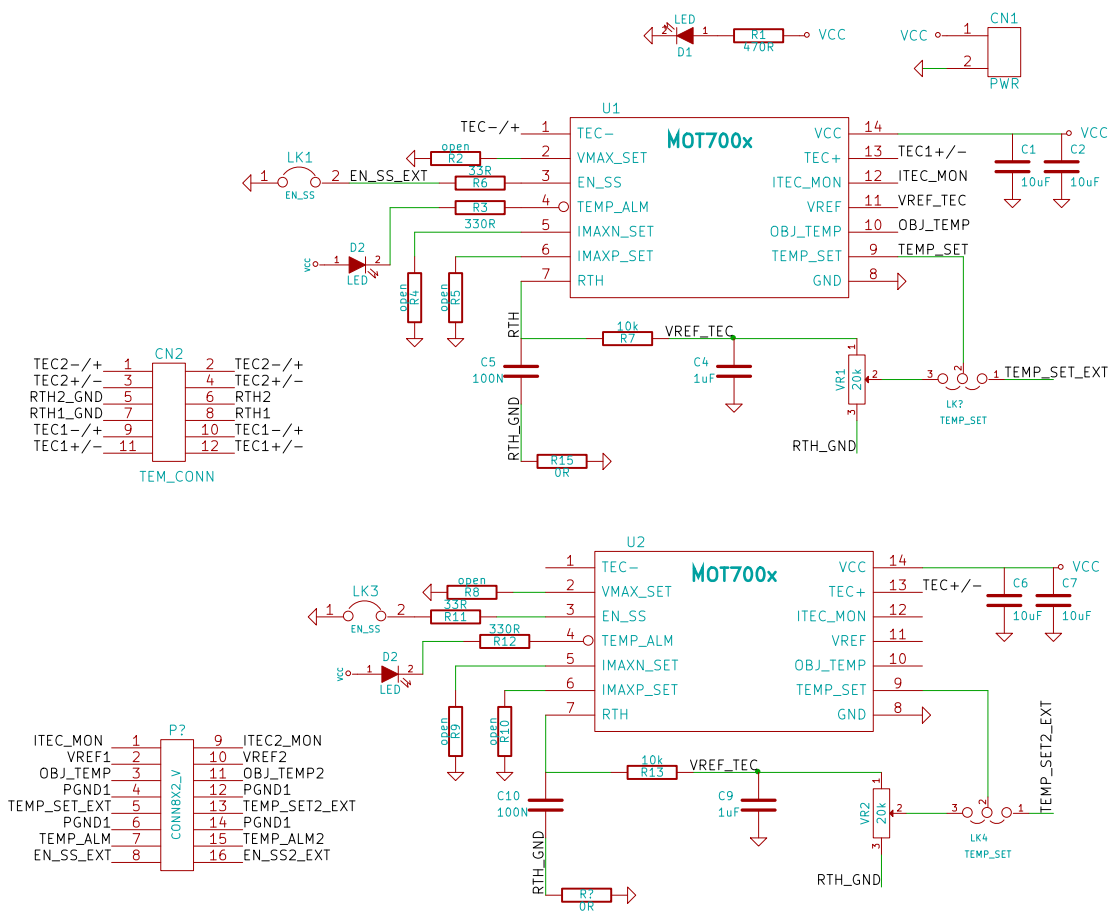
CN10 Pin Identification

	Inputs Outputs
TEC_MON	Current Monitor
VREF	VREF
OBJ-TEMP	Object Temperature
GND	Ground
TEMP_SET_EXT	Temperature Set Voltage
GND	Ground
TEMP_ALM	Temperature Alarm
EN_SS_EXT	Enable / Softstart

MOT702_OEM Schematic

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Contact Information:

Modular One Technology	Phone:	214-566-3708
5902 Wessex Court	Email:	info@modularonetechnology.com
Parker TX 75002	Web:	www.modularonetechnology.com

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