

EXO Laser Diode Pulsar Upgrade

Specification

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01/18/2012

General Guidelines

- All connectors will be gold plated.
- All permanent cables will be connected on the rear of the box
- Indicators and temporary connectors will be located on the front of the chassis

Chassis

- A 19" panel mount 2U chassis will enclose the electronics.
 - The "Front Panel" is defined as the side of the box with which mounts onto the equipment rack.
- Circuit board. A 5" x 10" circuit board will support the electronics. The board will be mounted flush with the rear panel. Standoffs will support the board in multiple locations.
- Laser Diodes. Two diodes (Thor Labs LP405-SF10) will be mounted inside the chassis using a mounting bracket (Thor Labs PTLB1).
 - Wire leads (Thor Labs SR9B) will be routed from the diodes to the circuit board. These wires will be soldered to the circuit board. The silkscreen will clearly indicate the diode connections on the circuit board.
 - The pigtail fibers will be routed to a connector on the rear panel (see below).
- A mechanical control drawing will define the location of all components defined in this document as well as defining the PCB dimensions and mounting hole locations.

Rear Panel

- Fiber feed through for diode channels A & B. Each channel will have a separate FC style feed through on the rear panel. There are three options for this connector (please choose one):
 - Option 1: <http://www.l-com.com/item.aspx?id=2009>
 - Option 2: <http://www.l-com.com/item.aspx?id=2011>
 - Option 3: <http://www.l-com.com/item.aspx?id=2013>
- Power input. The power input to the chassis will be a 12V "wall wart" power supply (Digikey MW172KB1203F01) with a current output of 1.5 Amps. The stock connector will be replaced with a 2-pin Molex power connector.

- Board side connector: Molex 39-34-4026
- Power supply housing: Molex 39-01-2025
- Power supply pins: Molex 39-00-0074
- TEM Interface connector. Used to pass configuration/trigger information between TEM and Laser Diode Pulser board.
 - Right angle BNC. TE Connectivity 5227161-9.
 - 200 ohm termination (TEM has limited drive strength).
 - 3.3V signaling active high.
- Serial (RS232) expansion connector (Digikey AE10384-ND). Used for future configuration interface.
 - RJ45 right angle board mount connector. Yost DTE standard.
 - Pin 6 = Tx Data (from FPGA)
 - Pin 3 = Rx Data (to FPGA)
 - Pin 4 + GND
 - Pin 5 = GND

Front Panel

- Debug monitor outputs (2x). These allow the user to monitor the voltage applied to each of the diodes. A board mount right angle connector will interface to a panel mount BNC connector using a short length of BNC cable.
 - 2x right angle BNC. TE Connectivity 5227161-9.
 - 2x panel mount BNC feed through. Mouser 565-3847
 - 50 ohm drive.
- Power LED. Green LED which is lit when power is applied to the box. LED is panel mount with pigtail leads which are soldered to the board. The board silkscreen will clearly define the wire connections.
 - Dialight 559-5201-007F
- Warning LED. Yellow LED which is lit when a communication error is detected. LED is panel mount with pigtail leads which are soldered to the board. The board silkscreen will clearly define the wire connections.
 - Dialight 559-5301-007F

Operation

The Laser Diode Pulser box will be triggered and configured through the TEM. A to be defined serial protocol will allow TEM register writes (register to be determined) to be converted into configuration updates to the pulser. A special serial word will be used to trigger the diodes from a bit in the TEM's conversion control register.

The following configuration settings will be available through the TEM.

- Diode Select. Defines the diode mode of operation.
 - Diode A only
 - Diode B only
 - Alternate between DiodeA and DiodeB from pulse to pulse.
- Diode duration settings. Range of 1uS – 256uS in 1uS increments.
 - Diode A duration
 - Diode B duration
- Diode level setting. This is an 8-bit value which controls the amplitude of the Diode.
 - Diode A amplitude
 - Diode B amplitude
- Reset. A reset signal will reset the laser pulser whenever the TEM is reset.
- Because all settings are read only the serial protocol will include error checking. If a communication error is detected the received command/setting will be ignored and an error LED will be lit. The error LED will stay lit until a reset from the TEM is received. Future properly formatted (no error) serial commands will continue to be decode.