



AN-14 LASER DAMAGE FROM LOOSE CABLING

High-power laser diodes can suffer damage or shortened lifetimes due to poor connections between the laser and the laser diode driver. All wiring between the laser driver and the laser diode should consist of solid connectors, sockets, or soldered connections. Temporary connections, such as alligator clips, should never be used.

In the majority of cases of unexplained sudden failure of a laser diode, the problem is in the connectors or cabling between the laser driver and the laser diode. Laser diode drivers are designed to operate in “constant current” mode, meaning the driver automatically adjusts its output voltage to maintain a constant current in the loop between the driver and the laser. The laser could be damaged if there is any kind of loose or broken wire, a bad socket, or an intermittent connection somewhere in the current loop. If there is a momentary break in the current loop, a constant-current laser driver will increase its output voltage to maintain the desired current. If that momentary break in the loop reconnects, the higher-than-normal voltage is applied to the laser diode, damaging it.

It is possible that the problem lies within the laser diode driver itself, but this would be very unusual. Any power supply designed for use with laser diodes would include features to protect against overshoot/undershoot during modulation or during turn-on/turn-off. Also, most high-current CW laser diode drivers typically include a “slow-start” feature that limits the current rise time. Unexplained sudden laser failures are far more likely due to poor cabling and connectors between the laser and the driver.