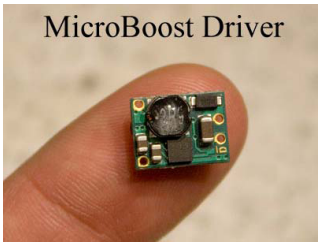
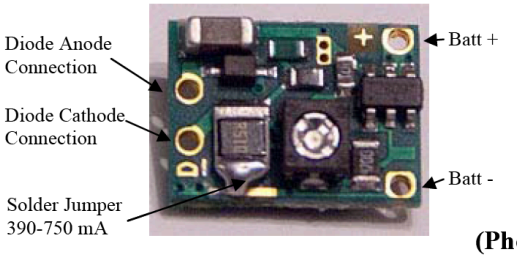
Micro Boost Drive V1 Manual Rev 2

The Micro Boost Driver is a high-efficiency switching current regulator that can be powered by battery combinations which result in a Voltage of 2.7 – 5.5V DC (and up to 6.4VDC with a diode in series). This includes 2-4 AAAs, AAs, Cs, Ds, and single lithium batteries primary and rechargeable. The driver operates as a current regulated source, boosting the output voltage above the battery voltage as necessary to meet the current output setting. In operation, the driver will drain the power source until its voltage reaches 2.5V and then will shut off. This, combined with the high efficiency of the driver provides a runtime exceeding that of linear regulator drivers for portable lasers.



Warning: This driver is a current source mode driver. Do not disconnect the laser diode while operating, diode damage may result. Use secure solder joints for laser diode connection.



Parameter	Specification	Unit
Input Voltage Range	2.7 - 5.5	V
Output Voltage Range	VBatt - 13	V
Output Current Range	0.065-1.2	A
Conversion Efficiency	76-86	%
Regulation Ripple (4-100kHz)	< 5%	%

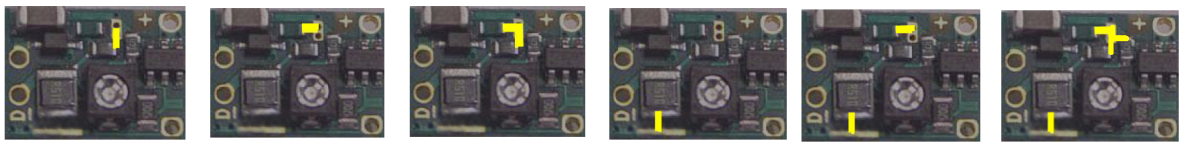
(Photo of bottom of Micro Boost Drive V1.)

Current Setting:

The Micro Boost Drive has five output current ranges, listed in the diagram below. Ranges are selected by soldering a a bridge (solder blob) across the locations indicated. Each range listed is approximate, there is slight variation from unit to unit so test the closest range to your desired current and move up or down range if necessary.

For highest efficiency operation, select the highest current range that still includes your desired current. To adjust and set the diver current, a dummy load is required. A series of 3 or 4 1N4001 diodes and a 1 to 0.2 ohm resistor is recommended for use as a dummy load. Use the Voltage across the dummy load resistor to determine current, or put your multi-meter in current mode in series with the dummy load. Output current is adjusted via the potentiometer trimmer. An insulated screwdriver and a light touch are recommended for adjustment.

65-130mA **140-280mA** **210-410mA** **390-750mA** **540-1000mA** **560-1200mA**



Powering the driver:

If 6V or greater battery source is to be used, the input voltage must be dropped to no greater than 5.8VDC. For example, if two Lithium primary CR123As are used, each with a maximum surface charge voltage of 3.2V, a 1N4000 series diode should be placed in series with the driver power input. The Micro Boost Drive contains built-in battery reverse polarity protection, so putting the batteries in backwards will not damage the driver or diode. Unlike many other drivers, the battery negative (-) connection and the diode – (cathode) connections are **NOT** continuous. As such, the diode anode and cathode must be electrically isolated from the laser casing, if the casing is connected to a battery terminal. Most Blu-Ray 405nm diodes are constructed with an anode and cathode electrically isolated from the casing, so no extra isolation is needed.

Maximum current limitations for full input voltage range:

The Micro BoostDrive is built using the latest technology and is designed to have a very wide range of output currents and voltages. However, not every combination of input voltage, output voltage and output current is useable. For example a 12V load cannot be powered at 1 Amp with an input voltage of 3.0V. Here are the recommended output current ranges for the full 2.7-5.5V input range per output voltage:

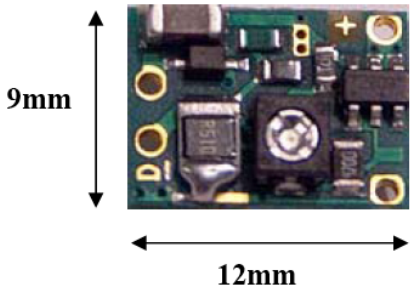
75-700mA boost 5V out
75-500mA boost 6.5V out
75-700mA boost 6.75V out with full Li-Ion battery in

A good rule of thumb to follow for input/output conversion is:
(Vout (Volts) * Iout (Amps)) / Vin (Volts) < 1.2

Warning!
This manual assumes use of a laser output power below 5mW. If your laser product optical output is greater than 5mW and sold in the U.S., you must adhere to CDRH regulations which may require additional wiring including interlocks.

Driver Fitment:

The Micro BoostDrive can easily fit in most laser cases including AAA powered lasers and even inside the 'Aixiz' modules. Care should be taken not to allow the driver to contact conductive sides of the laser casing. In the event that the casing does come close to the driver, you can wrap the driver in a single layer of insulating electrical tape to prevent shorts to the casing.



(Photo of Bottom of MicroBoost V1.)

Soldering Precautions:

Always solder using a static draining soldering iron, in a static free location with an anti-static wrist strap or other static-draining bodily contact. Use a fine-tipped soldering iron when soldering leads to the driver, and when soldering the lower range solder jumpers. Use caution not to create a solder bridge to nearby adjacent components except as stated below: For highest margin of error, solder the diode to the driver on the top side where a solder bridge to the adjacent capacitor and diode is acceptable, solder the – batt connection also on the top side where a solder bridge to the 2 adjacent capacitor pads is fine. Solder the batt + on the bottom side where a solder bridge to the adjacent 2 pins is acceptable, do not bridge to the 3rd pin.

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