Premier & Acculase Modulatable Laser Diode Modules
Premier & Acculase Range.

The Premier & Acculase laser diode modules represent the highest level of optical and electrical performance at an economical price, a combination that is unmatched in the marketplace. The Acculase also has the additional benefit of the output beam being accurately aligned to the outer sleeve during manufacture.

The secret of their superiority is a control circuit design that not only gives you excellent output power stability over time and temperature, but also offers fast, closed-loop modulation with an extinction ratio as high as 10,000:1. Two control circuits are available, either the LC (Linear Control) or the PWM (Pulse Width Modulation).

The LC version allows you to control the output intensity linearly by applying a voltage of between 0 to 1 volts, to the control input. The output intensity will faithfully replicate any arbitrary signal you wish to apply within the limits of the laser diode module’s maximum rise and fall time.

The PWM version allows you to use pulse width modulation of the output intensity from a TTL level input signal, again within the limits of the laser diode module’s maximum rise and fall time. You can therefore control the mean intensity of the laser beam simply by changing the mark to space ratio or modulate the laser with coded information. The PWM 24V model can be powered from an industry standard 24 Vdc supply while retaining the modulation functions of the PWM model.

A wide range of wavelengths, powers and lens options are available, each combination having been carefully selected to provide you optimum performance, while ensuring the laser diode is never over driven.
Mounting Options

Heavy Duty Mounting Clamp
The optional heavy duty mounting clamp allows the Premier & Acculase range to be securely fixed at any required direction or angle. The base plate has a series of threaded holes which allows the clamp to be fixed directly onto a machine or workbench.

Magnetic Mount
A magnetic base is also available which allows the heavy duty clamp to be magnetically attached to a ferrous surface, negating the need for any mounting holes.

Swivel Mount Clamp
The optional swivel clamp allows the Premier & Acculase to be mounted securely. It offers the user up and down movement as well as ± 45° horizontal swivel. The base plate has a series of holes which allows the clamp to be fixed directly onto a machine or workbench.
Projection Options

A range of diffractive optical elements (DOE) are available to provide various patterns such as crosses, circles and dot matrix for applications such as 3D mapping, surface texture analysis, alignment and general machine vision applications. Please see the Projection Lens Datasheet for further information.

- Circle with center dot
- Dot Array
- Dot Lines
- Viewfinders
- Multiple Lines
- Dot Circle
- Cross
- Grids

We offer a range of DOE’s to provide various patterns such as crosses, circles and grids for such applications such as 3D mapping, surface texture analysis, alignment & general machine vision applications.
Lens Options

Three standard user adjustable collimating lens type are available. These are as follows:-

**Standard Lenses:-**
S Lens: Produces an elliptical collimated beam or focussed spot
C2 Lens: Produces a circular collimated beam or focussed spot
HG: Produces an elliptical collimated beam or well defined spot over working distance

*Please note we have a number of other collimating lens options. If the listed lenses do not meet your requirements please call us.*

**Optional Line Lens Assemblies:-**
L4 Line Lens: Produces a gaussian line with a full fan angle of typically 8°
L8 Line Lens: Produces a gaussian line with a full fan angle of typically 16°
LW53: Produces a gaussian line with full fan angle of typically 90° *(Premier only)*
Aligned Rod Lens: Produces gaussian line with a full angle of typically 90° *(Acculase only)*

*Please note other fan angles are available on request.*

### Power Options

<table>
<thead>
<tr>
<th>Wavelength</th>
<th>Power</th>
<th>Maximum Power Output With Lens</th>
</tr>
</thead>
<tbody>
<tr>
<td>635nm</td>
<td>1, 3, 5, 10, 15, 20mW</td>
<td><strong>S &amp; HG Lens</strong> 20mW</td>
</tr>
<tr>
<td>650/660nm</td>
<td>1, 3, 5, 10, 20, 30, 50, 80mW</td>
<td><strong>S &amp; HG Lens</strong> 80mW</td>
</tr>
<tr>
<td>670nm</td>
<td>1, 3, 5mW</td>
<td><strong>S &amp; HG Lens</strong> 5mW</td>
</tr>
<tr>
<td>685nm</td>
<td>10, 20, 35mW</td>
<td><strong>S &amp; HG Lens</strong> 35mW</td>
</tr>
<tr>
<td>785nm</td>
<td>1, 5, 10, 20, 35, 50, 75mW</td>
<td><strong>S &amp; HG Lens</strong> 75mW</td>
</tr>
<tr>
<td>808nm</td>
<td>55, 100, 150mW</td>
<td><strong>S &amp; HG Lens</strong> 150mW</td>
</tr>
<tr>
<td>830nm</td>
<td>1, 3, 5, 20mW</td>
<td><strong>S &amp; HG Lens</strong> 20mW</td>
</tr>
<tr>
<td>850nm</td>
<td>1, 3, 5, 20mW</td>
<td><strong>S &amp; HG Lens</strong> 20mW</td>
</tr>
<tr>
<td>880nm</td>
<td>1, 6mW</td>
<td><strong>S &amp; HG Lens</strong> 6mW</td>
</tr>
<tr>
<td>905nm</td>
<td>1, 6mW</td>
<td><strong>S &amp; HG Lens</strong> 6mW</td>
</tr>
<tr>
<td>980nm</td>
<td>5, 30mW</td>
<td><strong>S &amp; HG Lens</strong> 30mW</td>
</tr>
<tr>
<td>Custom</td>
<td></td>
<td>Please call with your requirements</td>
</tr>
</tbody>
</table>

**NOTES:-**
Wavelength tolerance can vary typically by ±10nm.
Power levels refer to the maximum diode output power. Output power will vary depending on optical configuration.
Not all wavelengths and powers are available with all lens options or driver PCB options.
## Specifications

<table>
<thead>
<tr>
<th>Mechanical Information</th>
<th>Acculase LC</th>
<th>Acculase PWM - 5V</th>
<th>Acculase PWM - 24V</th>
<th>Premier LC</th>
<th>Premier PWM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mass (grams)</td>
<td>14</td>
<td></td>
<td></td>
<td>17</td>
<td></td>
</tr>
<tr>
<td>Dimensions (mm)</td>
<td>15 x 47</td>
<td></td>
<td></td>
<td>15 x 47</td>
<td></td>
</tr>
<tr>
<td>Housing</td>
<td>Anodised Aluminium</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Isolated Body</td>
<td>Yes</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lead Length (mm)</td>
<td>500 (Other lead lengths available on request)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Connector Type</td>
<td>JST PHR4 4pin</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Optical Information

<table>
<thead>
<tr>
<th>Diode Power (mW)</th>
<th>1 to 150*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Typical Power Stability over Temperature range (%)</td>
<td>≤1% #</td>
</tr>
<tr>
<td>Wavelength (nm)</td>
<td>635 to 850</td>
</tr>
<tr>
<td>Beam Diameter</td>
<td>*</td>
</tr>
<tr>
<td>Beam Divergence</td>
<td>*</td>
</tr>
<tr>
<td>Bore Sighting (mrad)</td>
<td>&lt; 1 (Note 1)</td>
</tr>
<tr>
<td>Pointing Stability vs. Temperature</td>
<td>≤10 (Note 1)</td>
</tr>
<tr>
<td></td>
<td>&lt; 0.01 mrad/°C</td>
</tr>
</tbody>
</table>

### Environmental Information

<table>
<thead>
<tr>
<th>Operating Case Temperature (°C)</th>
<th>-10 to +45*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Storage Temperature (°C)</td>
<td>-10 to +80</td>
</tr>
<tr>
<td>Operating Humidity (%RH)</td>
<td>90 (non condensing)</td>
</tr>
<tr>
<td>MTTF @ 25°C (hrs)</td>
<td>&gt;30,000*</td>
</tr>
</tbody>
</table>

### Electrical Specifications

<table>
<thead>
<tr>
<th>Input Voltage V+ (Red Lead - Pin 1)</th>
<th>5 Vdc ±5% (Note 2)</th>
<th>5-30</th>
<th>5 Vdc ±5% (Note 2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input Voltage (Black Lead - Pin 2)</td>
<td>0 Vdc</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operating Current Drive Circuit (mA)</td>
<td>4 (Typical)</td>
<td></td>
<td>4 (Typical)</td>
</tr>
<tr>
<td>Operating Current (mA)</td>
<td>Varies with laser diode type and temperature</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reverse Polarity Protection</td>
<td>Yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rise &amp; Fall Times* (µs)</td>
<td>1</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Frequency Range</td>
<td>DC to 300KHz (Note 3)</td>
<td>DC to 1MHz</td>
<td>DC to 500KHz</td>
</tr>
<tr>
<td>Linear Control Voltage Range (Yellow Lead - Pin 3) LC Version</td>
<td>0-1V (See Chart)</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Modulation Voltage Range (Yellow Lead - Pin 3)</td>
<td>0-1V</td>
<td>TTL Low = Off TTL High = On</td>
<td>TTL Low = Off TTL High = On</td>
</tr>
<tr>
<td>TTL Enable (Blue Lead - Pin 4)</td>
<td>N/A</td>
<td>&lt;4 = Off &gt;2V = On</td>
<td>&lt;4 = Off &gt;2V = On</td>
</tr>
<tr>
<td>Earth (Yellow/Green Lead - Pin 4)</td>
<td>Earth</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>

### NOTES
* Varies with laser diode type and output power. Data based on Premier 650nm 1mW C2 Lens
* Varies with laser diode type
Note 1 - @ factory set focus
Note 2 - Some models may run on 3.3 to 5 volts. Please contact us for availability
Note 3 - Measure with 90% modulation depth sine wave to -3dB
All specifications are typical @ 25°C
Standard Driver Types

Two driver boards are available for the Premier & Acculase laser, either a Linear control or Pulse Width Modulation.

Linear Intensity & Analogue Modulation Control (LC Model)

User Adjustable Intensity Control

Using the yellow control lead output power intensity may be linearly controlled from zero to the maximum factory set value. This may be achieved using a simple resistor or by applying a control voltage between 0 and 1V where 0 Vdc is off and +1 Vdc is maximum, with a linear relationship for every value between, e.g. an input of 0.5V would produce an output intensity of half maximum.

![Graph showing linear relationship between control voltage and output power](image)

Modulation

Using the yellow control lead the laser may be modulated by using an external signal. The required voltage range is 0 to +1 Vdc (to set the maximum intensity), frequency range is DC to 300 kHz. Please note: applying more than 1V does not increase the power above maximum but it can reduce the maximum frequency of modulation.

*Note: Intensity control and modulation functions may be used together.*

4th Pin - Earth

The LC versions have a 4th pin which provides a highly resistive path path from 0V in order to safely displace any unwanted over voltages.

Pulse Width Modulation TTL Digital Control (PWM Model)

The Acculase/Premier laser is also available with a TTL driver board that allows the unit to be gated on and off, or pulse-width modulated at TTL voltage levels via the yellow control lead.

Rise Time: < 0.5us*
Fall Time: ~ 0.5us*

* = *Varies with model*

4th Pin - Enable Function

The PWM/TTL versions have a 4th pin enable function which is also responsive to TTL voltage levels and functions as an electronic switch to quickly turn the laser on and off without the need to disturb the power supply. A TTL level high turns the laser on and a TTL level low turns the laser off.
Laser Safety

Our lasers are compliant to IEC 60825-1 2007 standards. The lasers fall within one of the following classifications depending on power and wavelength.

Quality & Warranty

The Premier and Acculase range is supplied with a 12 month parts and labour warranty. Our manufacturing operations are certified to ISO9001.
Mechanical Drawings

Acculase LC & PWM

Dimensions: 47mm x 15mm

- Pin 1 - Red
- Pin 2 - Black
- Pin 3 - Yellow
- Pin 4 - LC = Green/Yellow
- Pin 4 - PWM = Blue

Acculase LC & PWM with L4/L8 Line

Dimensions: 53.5mm x 15mm

- Pin 1 - Red
- Pin 2 - Black
- Pin 3 - Yellow
- Pin 4 - LC = Green/Yellow
- Pin 4 - PWM = Blue

Premier LC & PWM

Dimensions: 47mm x 15mm

- Pin 1 - Red
- Pin 2 - Black
- Pin 3 - Yellow
- Pin 4 - LC = Green/Yellow
- Pin 4 - PWM = Blue

Premier LC & PWM with L4/L8/LW53 Line

Dimensions: 53mm x 15mm

- Pin 1 - Red
- Pin 2 - Black
- Pin 3 - Yellow
- Pin 4 - LC = Green/Yellow
- Pin 4 - PWM = Blue

Drawings not to scale
Mechanical Drawings

Heavy Duty Mounting Clamp

Swivel Clamp

Mounting hole on base 4 x 4.5mm

M5 Mounting hole on base

Drawings not to scale

Please note: Global Laser reserve the right to change descriptions and specifications without notice.