



# DCLM Lyte-MV Userguide

Digitally Controlled Laser Module

Digital Control via USB for Laser Modules

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# 1.0 Welcome to our Digitally Controlled World

Thank you for purchasing the DCLM Lyte-MV Development Kit. The module in this kit emits a red spot or projection using the range of lenses included with this Kit.

If you have any queries or require help when using the DCLM Lyte-MV please call us on +44 (0)1495 212213 or contact your local representative. You may also wish to visit our website at [www.globallasertech.com](http://www.globallasertech.com) and following the links to the DCLM to learn more about digital control and to see case studies which are continually being added to the site.

The DCLM Lyte-MV Development Kit has all the functionality of the machine vision laser with the addition of a digital PCB control circuit which allows the user to program and control the DCLM output via the USB digital interface. The Datasheet for the Digital PCB Driver is included on the CD.

The kit consists of a 35mW 660nm Lyte-MV laser diode module which is supplied with six interchangeable optics which allows you to project a wide range of projections including uniform lines, cross, dot matrix, circles and a grid. The adjustable focus allows you to focus the output beam to a fine spot or projection depending upon the fitted interchangeable optic. Also, included in this kit is a robust heavy duty clamp which allows for parallel and vertical adjustment allowing the laser to be aimed in any required direction or angle. The kit is provided in a rugged plastic carrying case designed to safely and securely store all the kit's components.

The digitally controlled laser uses an on board PIC and contains the copyrighted firmware developed by Global Laser and is powered via a USB port on a computer or a powered USB hub. The software provides a user friendly graphical interface which allows the following functions to be controlled via the firmware:

- Power
- Modulation
- TTL
- PWM

Additionally, the output can be modulated via a sine or triangle wave with the signal type or modulation frequency simply controlled via the menu in the control software which programs the on board function generator. The output can also be switched on and off via TTL or PWM with the TTL frequency and PWM duty cycle all controlled from the software.

## 2.0 Focus Adjustment

The DCLM will be tested and shipped set to a focus distance of 300mm. Should you need to adjust the focus please follow the simple instructions below:

- a.** Slacken the four M2.5 grub screws, which secure the prism lens/ interchangeable patterns optic using the allen key supplied.
- b.** Remove the prism lens assembly.
- c.** Insert focus key into laser barrel and align with focus control groves.
- d.** Turn the focus key to project the smallest spot at the required working distance.
- e.** Re-fit the line optics and align the ridge of the line lens to the major axis of the laser beam. Make minor adjustments via the four M2.5 grub screws to achieve an optimum line.
- f.** If the pattern optics is being re-fitted, simply refit and rotate to achieve the desired projection then tighten the M2.5 grub screws.

## 3.0 Changing the Optics

A set of 5 interchangeable patterns optics have been supplied with your DCLM Lyte-MV Development Kit including:

Cross (37° fan angle)

7 Lines, (21.7° fan angle)

4x4 Grid, (4.57° fan angle)

5 Concentric Circles (28.6° fan angle)

21x21 Dot Array (7° fan angle)

To change the pattern, please follow the instructions below:

- a.** Remove any interchangeable pattern optics if fitted.
- b.** Replace the interchangeable pattern optics and rotate to achieve the desired projection.
- c.** Please ensure that any optics not fitted to the laser module is keep away from sources of dust etc.

## 4.0 Mounting and Heatsinking

To ensure the lifetime and the stability of the DCLM it is recommended that it is mounted in a suitable Heat sink/mount. The case temperature should be kept within the specified range at all times failure to do this could result in shortened lifetime or catastrophic failure. As a guide, laser diode lifetime decreases by a factor of two (approx.) for every ten degree increase in operating temperature.

Global Laser's Heavy duty clamp is supplied as stranded for the Machine Vision Development Kit.

Global Laser's Heavy Duty Clamp has parallel and vertical adjustment which allows the user to aim the laser in any required direction or angle, the robust aluminium construction also assists in conducting heat away from the DCLM Lyte-MV body as well as prevents movement due to shock and vibration. The base plate of the Heavy Duty Clamp has a series of threaded holes to allow the Heavy Duty Clamp to be securely fastened to stable surface.

### 4.1 Mounting the DCLM Lyte-MV in the Heavy Duty Clamp

- a.** Un-tighten Allen screw A (see drawing 11.2) with the supplied Allen key.
- b.** Slide the laser into the mounting hole (see drawing 11.2) and tighten Allen key A.
- c.** For vertical adjustment of the laser un-tighten Grub screw A (see drawing 11.2). This will allow the section mounting the laser to be adjusted. When the vertical posting is complete re-tighten grub screw A.
- d.** For horizontal adjustment of the laser un-tighten Grub screw B (see drawing 11.2). This will allow the main body of the mount to be moved. When the horizontal positing is complete re-tighten grub screw B.
- e.** To secure the Heavy duty clamp to a surface machine screw or studs can be used in conjunction with the base section (see drawing x for thread details).

# 5.0 Fan Angle & Working Distance

The size of the fan angle (or spread of the beam) will determine how long the line is. When viewed from the same distance and at 90° to the surface a line with a fan angle of 90° will be longer than a line with a fan angle of 30°.

Fan Angle (Degrees)	Distance to Object (mm)	Line Length (mm)
30	100	54
90	100	200

As a guide to relationship between working distance, pattern/line length and fan angle please see table below.

		Fan Angle (Degrees)					
		4.57	7	21.7	28.6	30	37
Distance From Object (mm)	250	20	31	96	127	134	167
	500	40	61	192	255	268	335
	750	60	92	287	382	402	502
	1000	80	122	383	510	536	669
	1250	100	153	479	637	670	836
	1500	120	183	575	765	804	1004
	1750	140	214	671	892	938	1171
	2000	160	245	767	1020	1072	1338
	2250	180	275	862	1147	1206	1506
	2500	200	306	958	1274	1340	1673
	2750	219	336	1054	1402	1474	1840
	3000	239	367	1150	1529	1608	2008
	3250	259	398	1246	1657	1742	2175
	3500	279	428	1342	1784	1876	2342
	3750	299	459	1437	1912	2010	2509
	4000	319	489	1533	2039	2144	2677
	4250	339	520	1629	2167	2278	2844
	4500	359	550	1725	2294	2412	3011
4750	379	581	1821	2422	2546	3179	
5000	399	612	1917	2549	2679	3346	
5250	419	642	2012	2676	2813	3513	
5500	439	673	2108	2804	2947	3681	
							Pattern/Line Length (mm)

# 6.0 Software Installation

## 6.1 System Requirements

The Global Laser PC software program will currently only run on a Windows Operating System platform.

### 6.1.1 Supported Operating System

Windows XP Home SP2

Windows XP Pro

Windows Vista

Windows 7

Windows 8

Windows 8.1

The software will run on both 32 bit and 64 bit platforms for all the above operating systems.

### 6.1.2 Microsoft .Net Framework Configuration Requirement

DCLM software requires the Microsoft .Net Framework 3.5 or greater to be pre-installed on your PC or Laptop before this program will run.

If you do not have the installed framework the installation program will download the file automatically from the internet.

### 6.1.3 Hardware Requirements

To deliver a satisfactory performance the minimum hardware requirements are:-

**a. Processor**

400 MHz Pentium processor or equivalent (Minimum); 1GHz Pentium processor or equivalent (Recommended).

**b. RAM**

Depending on operating system, but 1GB should be treated as a minimum.

**c. Hard Disk**

Up to 10 MB of available space may be required.

**d. CD or DVD Drive**

Required.

**e. Display**

800 x 600, medium color, 16-bit (Minimum); 1024 x 768 high color, 32-bit (Recommended)

## **6.2 Installing the DCLM**

Before the DCLM software can detect the DCLM Lyte-MV connected to a USB port the appropriate driver needs to be installed separately for each of the PC USB ports you intend to use.

To do this please follow the following instructions:

**Warning:** If due to computer operation/settings the DCLM is not recognised by the operating system on connection to a USB port, the DCLM may turn on and run in its independent mode. This will mean the DCLM will emit laser radiation after a 15 second delay from being connected in accordance with the programmed start up settings, which could be 100% factory set CW output power.

- a.** Plug a DCLM into the USB port that you intend to use.
- b.** Once you have connected the DCLM to the USB port the Windows operating system will load the driver, this may take a few seconds and you should also have a message in the Notification Area of the Task Bar informing you of its progress.
- c.** Repeat steps a and b for each USB port you intend to use on the PC with the DCLM connected to each USB port in turn.

When the driver software has been successfully installed, you will then be able to communicate with the DCLM.

This installation process only needs to be carried out once for each USB port you intend to use on your PC.

## **6.3 Installing Software**

Please make sure you have installed the DCLM driver before installing the software from the CD provided in the kit. Refer to section 6.2 Installing the DCLM.



- Insert the CD into your CD/DVD drive.
- With AutoPlay enabled the setup program will run similar to Figure 1. If the Autoplay does not run refer to section 6.3.1
- Click the Run setup.exe

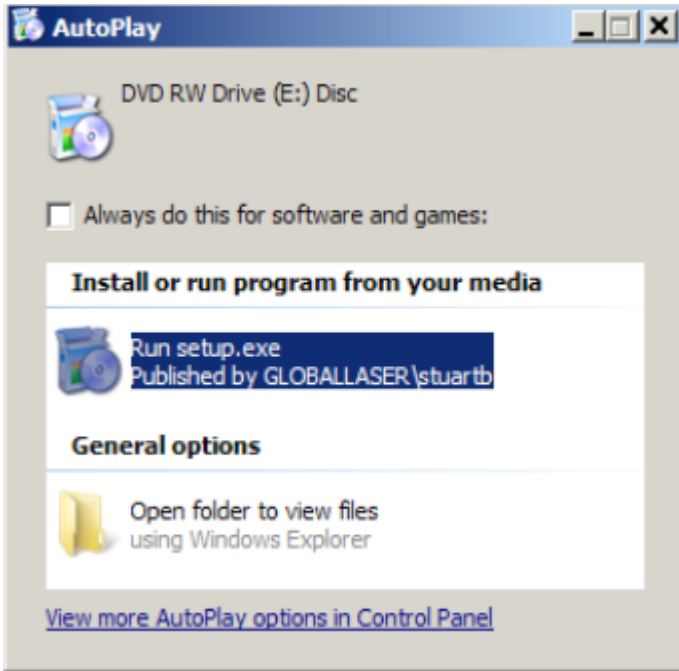


Figure 1

- The setup program will now check that your PC has the necessary files installed before installing the DCLM software. Refer to section 6.1.2 Microsoft .Net Framework for the files required.
- If you have the necessary files installed the DCLM install program will run as shown in Figure 2.

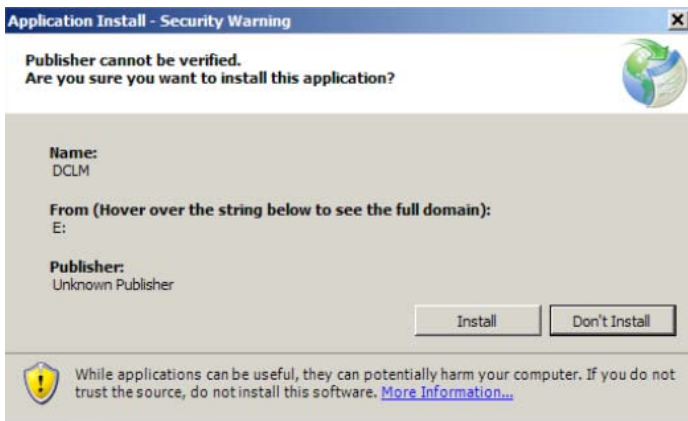


Figure 2

- Click the Install button.
- When the install program finishes the DCLM software will run and you can use it to look for any connected lasers.

### 6.3.1 Manual Installation for Windows XP

To run the install program click your Start button and select My Computer (see figure 3). Then double click the setup.exe file.

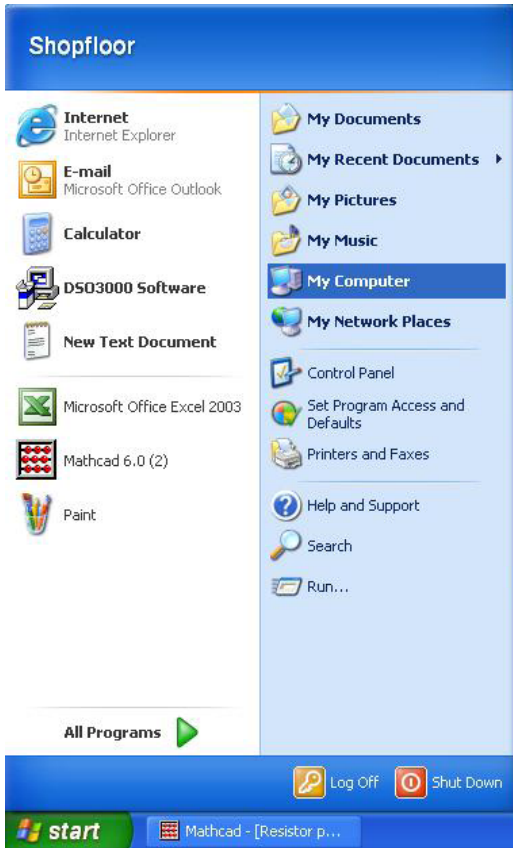


Figure 3

A Launching Application window will open for a few moments checking application requirement (which include the .Net framework.) (see figure 4)

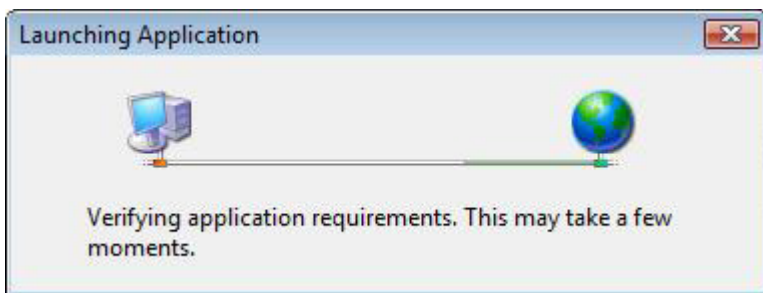


Figure 4

If your PC does not meet the minimum requirements, the launching application will check and download the required files from the internet. Once you have the application requirements you will be presented with the installation security dialogue (see figure 5).

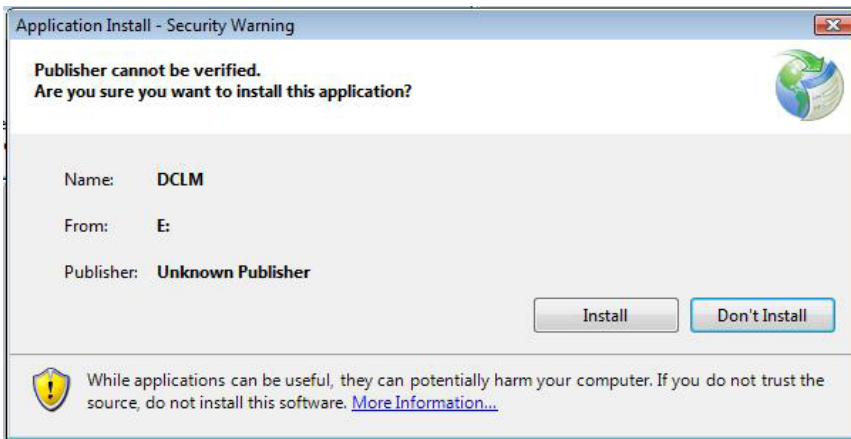


Figure 5

Click on the install button. When the software has been completely installed, it will automatically open.

### 6.3.2 Manual Installation for Vista/Win7

To run the install program click your Windows button and select Computer (see figure 6). Then Right click on your CD/DVD drive and choose Install.

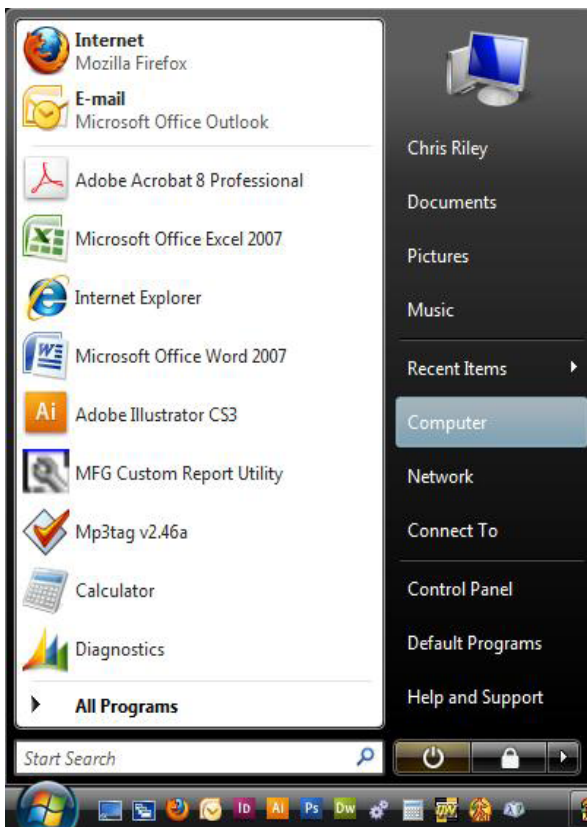


Figure 6

A Launching Application window will open for a few moments checking application requirement (which include the .Net framework.) (see figure 7).

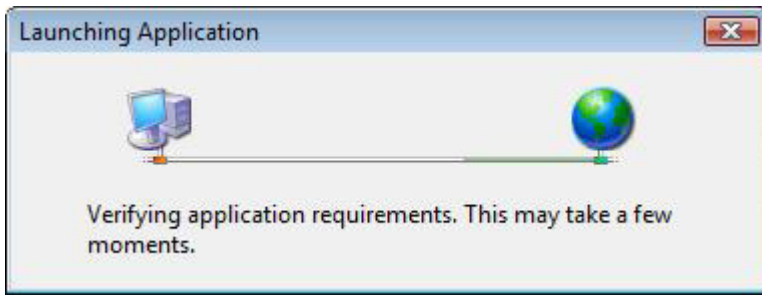


Figure 7

If your PC does not meet the minimum requirements, the launching application will check and download the required files from the internet. Once you have the application requirements you will be presented with the installation security dialogue (see figure 8).

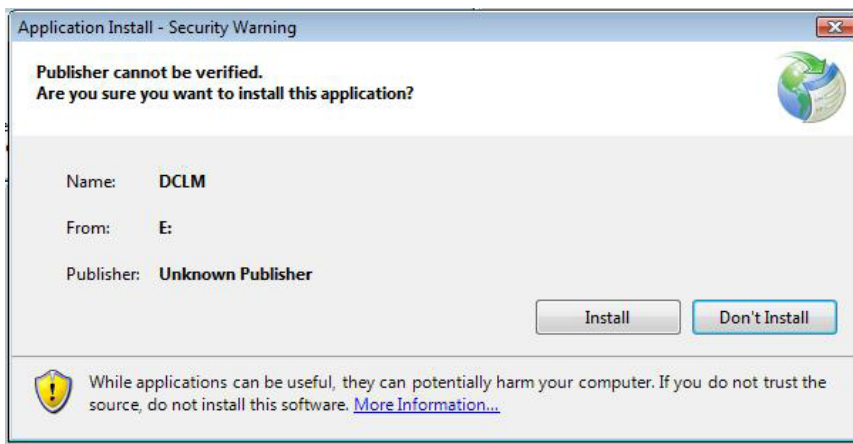


Figure 8

Click on the install button. When the software has been completely installed, it will automatically open.

## 6.4 Uninstalling the Software

You can uninstall the DCLM software program from your computer if you no longer use it or if you want to free up space on your hard disk.

- Open Programs and Features by clicking the Start button , clicking **Control Panel**, clicking **Programs**, and then clicking **Programs and Features**.
- Select the DCLM software, and then click **Uninstall**.

# 7.0 User Interface

The user interface is the central point where you can control and operate the DCLM.

Figure 9 shows the DCLM Control Panel.

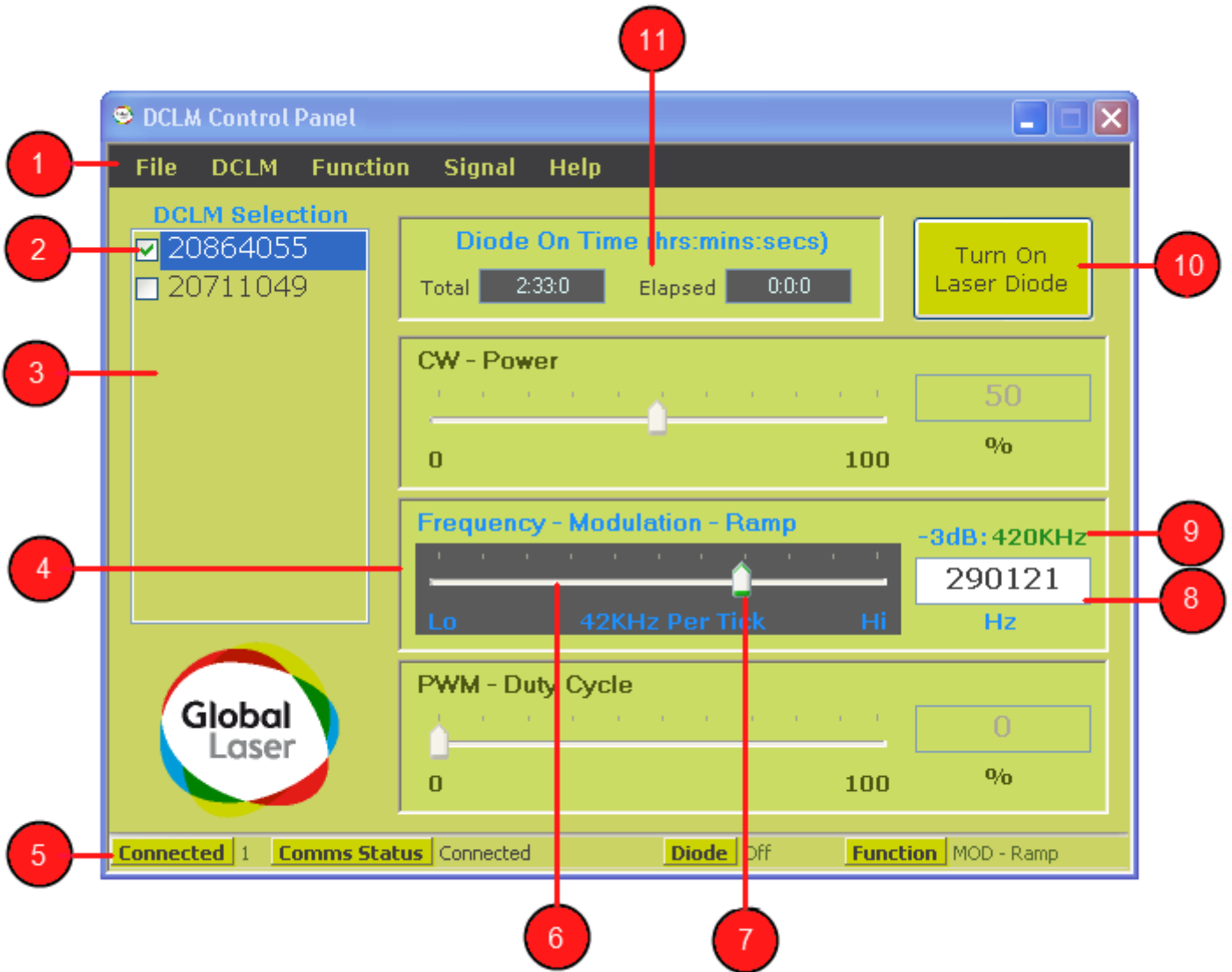


Figure 9

- 1 Main Menu Bar.
- 2 Selected DCLM
- 3 DCLM Selection List Box
- 4 Function Control Group
- 5 Status Bar
- 6 Slide Control Bar
- 7 Slide Control Tab
- 8 Function Control Data Box
- 9 Maximum Frequency at -3dB Point
- 10 Turn DCLM Laser Diode On/Off button
- 11 Diode on Time Display Panel

## **7.1 Menu bar**

The menu bar allows you to access buttons relating to the control and operation of the DCLM.

### **7.1.1 File**

From the File menu button you can exit the program.

### **7.1.2 DCLM**

From the DCLM menu button you can access the following items:

**a. Find**

The Find item when enabled will allow you to look for any DCLM that are attached to the computer USB ports.

**b. Turn On Laser Diode**

When enabled will allow you to turn on and off the laser diode.

**c. Reset**

Allows you to send a reset command to the laser to recover from a malfunction.

**d. Restore Factory Settings**

If the DCLM configuration data needs to be refreshed, you can request the DCLM to restore itself to the original factory settings using this command.

### 7.1.3 Function

The following functions are supported by the DCLM supplied with the development kit. With other DCLM kits, provided that the diode supports the type of operation being requested, then the DCLM can be set to provide the following functions.

**a. CW**

Continuous Wave.

**b. Modulation.**

This can be either a Sine or Triangle Waveforms.

**c. TTL**

Outputs a 50/50 Square wave variable frequency.

**d. PWM**

This function outputs a variable Pulse Width Modulation signal.

**e. Save Settings.**

Saves the selected control settings to the DCLM start up memory.

### 7.1.4 Signal

The Signal Menu option will allow you to select either a SINE or Triangle modulation waveform.

### 7.1.5 Help

**a. About**

Displays a window showing information relating to the software version and contact details.

**b. Firmware Version**

Displays a window showing the DCLM Firmware version

## 7.2 DCLM Selection List Box

This box displays the serial number of all DCLM's that are connected to the USB ports.

### 7.3 Diode On Time

This display panel shows the total and elapsed time that the laser diode has been “on” and working. The Total Time shows the number of hours the laser diode has been on. Elapsed time shows how long the selected laser diode has been “on” and working from the time it was last powered up.

### 7.4 Turn on Laser Diode Button

This button will command the DCLM to turn “on” or “off” the laser diode. It is also linked to the button found in the “DCLM/Turn on Laser Diode” menu option.

### 7.5 DCLM Controls

There are three Function Control Groups each having their own Slide Bars and Data Entry boxes from where you can configure the DCLM output.

Each Function Menu item will be enabled or disabled according to how the DCLM was configured from the factory. For the DCLM included in the Development Kit the panel is as follows.

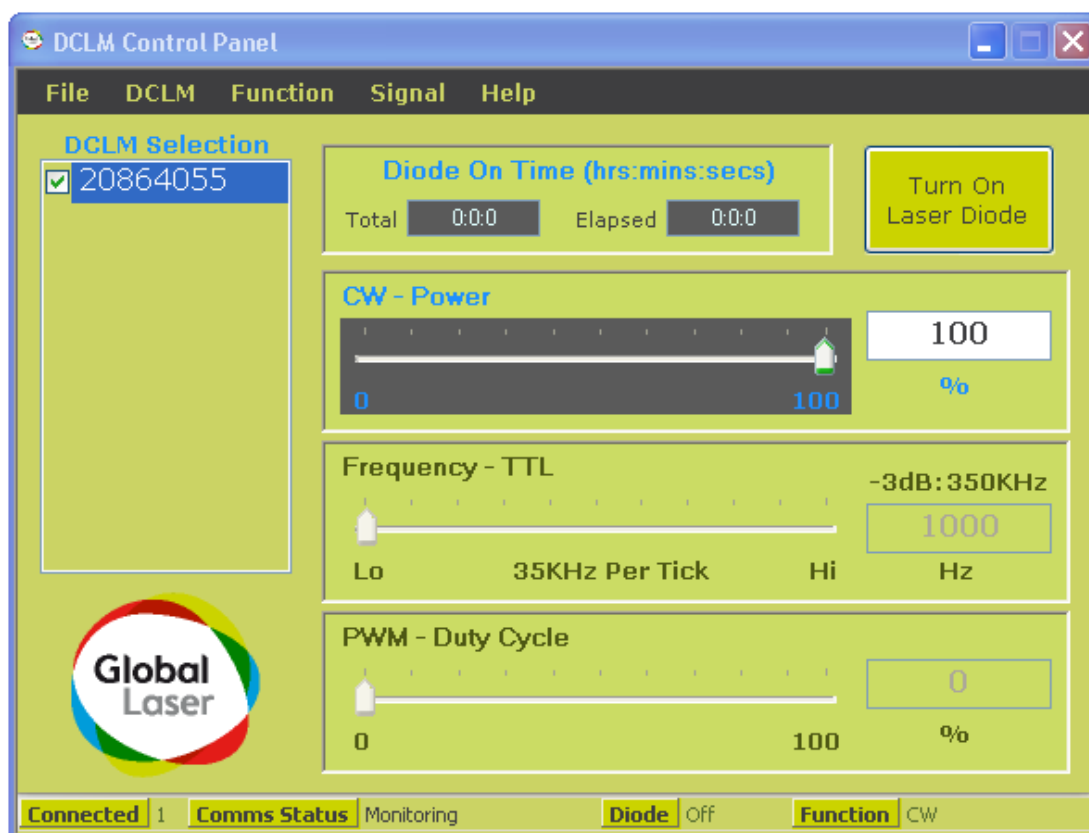


Figure 10



## 7.6 Status Bar

The Status Bar displays information relating to the selected DCLM as shown in the DCLM Selected List Box.

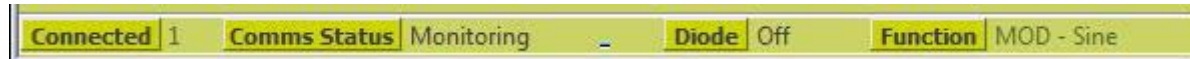


Figure 11

Information shown from left to right:

**a. Connected**

Displays how many DCLM's have been detected and communications have been established.

**b. Comms Status**

Displays what the program is doing with the selected DCLM.

**c. Diode**

Displays the current state of the laser diode.

**d. Function**

Displays the current output function of the selected DCLM.

# 8.0 Controlling and Programming the DCLM

The DCLM Lyte-MV can be configured to output any one of the four possible functions. See section 7.1.3 for more details.

An option is available to programme the DCLM to start up in any of the available functions. Software uses the programmed start up function to configure the relevant Function Control Group.

## 8.1 Looking for Connected DCLM's.

When the software program first starts it will automatically look for any connected DCLM's. If there are no connected DCLM's then the Find Menu item will be enabled. You will need to use the DCLM Find Menu item to look for any DCLM's that you connect after you start the program.

Once any DCLM's have been found any more you connect will automatically be detected and displayed by the program. All connected and working DCLM's will be displayed in the Connected Lasers list box. The program will highlight the first found DCLM and enable it as the selected DCLM. Each Function Menu item will be enabled or disabled according to the selected lasers configuration as detailed in section 3.1.3.

## 8.2 Controlling the DCLM.

Only one Function Control can be used at once.

Available functions can be seen from the Functions Menu item on the Menu Bar.

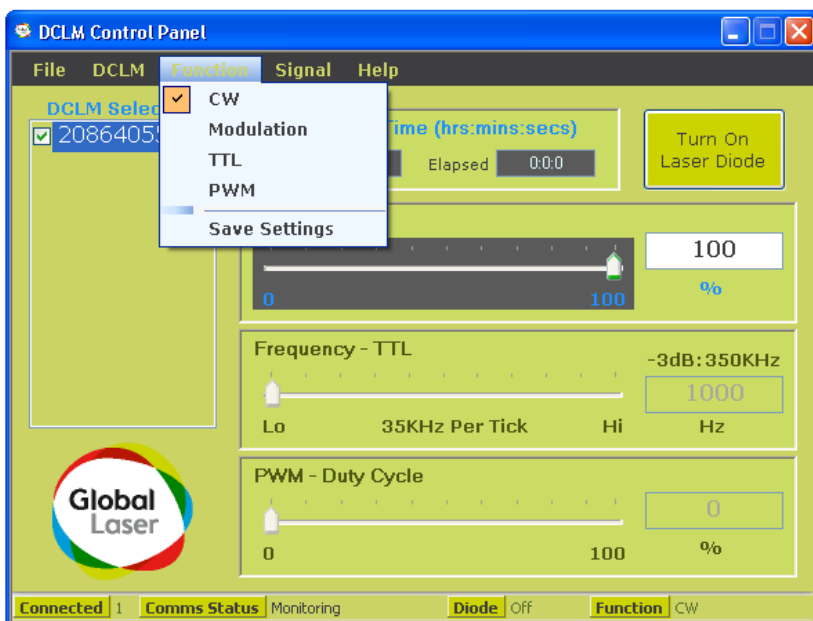


Figure 12

Function Control data values are sent to the DCLM in real time but are not saved in the DCLM, this means that if the power to the DCLM is removed the Control settings will be lost and the DCLM will start up in its last saved configuration.

Once a Function has been selected you can change the DCLM output by moving the Slide Bar Tab. The data value will be displayed in the Function Control Data Box.

You must remember to turn on the laser diode from either the DCLM – Turn On Laser Diode menu item on the Menu Bar or the quick Turn On Laser Diode button on the user interface before you can see any changes you have made from the Function Control.

There are a few ways of using the Function Controls:

- a.** Left mouse click on the Slide Bar Tab and drag the tab left or right across the Slide Bar.
- b.** Left mouse click either left or right of the Slide Bar Tab anywhere on the Slide Bar.
- c.** Left mouse click anywhere on the Function Control and then use the Up and Down arrows on the keyboard. The Up arrow decreases the data value and Down increases the data value.
- d.** Left mouse click in the Data Box and type in a valid data value for the type of Function Control. When you enter a valid data value the Slide Bar Tab will move to the relevant position on the Slide Bar.

NOTE:

If you enter an invalid data value in the CW or PWM Data Boxes a Red Out of Range message just below the relevant box will be displayed. You will need to amend the value before the program will send the data to the DCLM. The exception to this is when you are in modulation or TTL Mode. For these modes data can be sent to the DCLM when the Red Out of Range message appears, although the signal quality may be degraded.

### **8.2.1 CW Mode**

The CW Function Control allows you to change the output power of the DCLM from zero to 100% (max power) in 1% increments.

The Data Box will display the output power as a percentage of the full power set at the factory.

To select CW mode go to the Menu Bar and select the Function - CW menu item.

### **8.2.2 Modulation Mode**

This Control Function can output any one of two waveforms, SINE or Triangle at variable frequencies.

To select Modulation mode go to the Menu Bar and select the Function - Modulation menu item.

To change the Waveform go to the Menu Bar and select Signal - Waveform menu item. The waveform type is displayed on the Function Control and the Data Box will display the frequency in Hertz.

### 8.2.3 TTL Mode

This Control Function will output a square waveform that ranges from 0 – 100% of the power output. The waveform has a fixed mark/space ratio of 50/50.

The Data Box will display the frequency in Hertz.

To select TTL mode go to the Menu Bar and select the Function - TTL menu item.

### 8.2.4 PWM Mode

This Control Function will output a square waveform that ranges from 0 – 100% of the power output.

The mark/space ratio is adjustable from 0 – 100%.

The Data Box will display the Mark ratio percentage.

To select PWM Mode go to the Menu Bar and select the Function - PWM menu item.

## 8.3 Programming the DCLM

The following steps will allow you to save the active control setting to the DCLM.

- a. Select the Function control and data values you wish the DCLM to start up in
- b. Go to the Menu Bar and select Function and Save Settings
- c. If all opens well you will see a 'DCLM Programmed Successfully' Box.



## 9.0 Troubleshooting

If an error occurs in the program or within the DCLM you will see an error message box that will give you the following information.

**a. Serial Number.**

The DCLM that the error refers too.

**b. Error Code.**

The error code can be quoted when contacting Global Laser support.

**c. Error Description.**

Displays the reason why the error occurred.

**d. User Action.**

Displays information on any actions that you can take to resolve the error.

**e. Program Action.**

Displays what the program will do about the error after you have clicked on the OK button.

## 10.0 Contact Info

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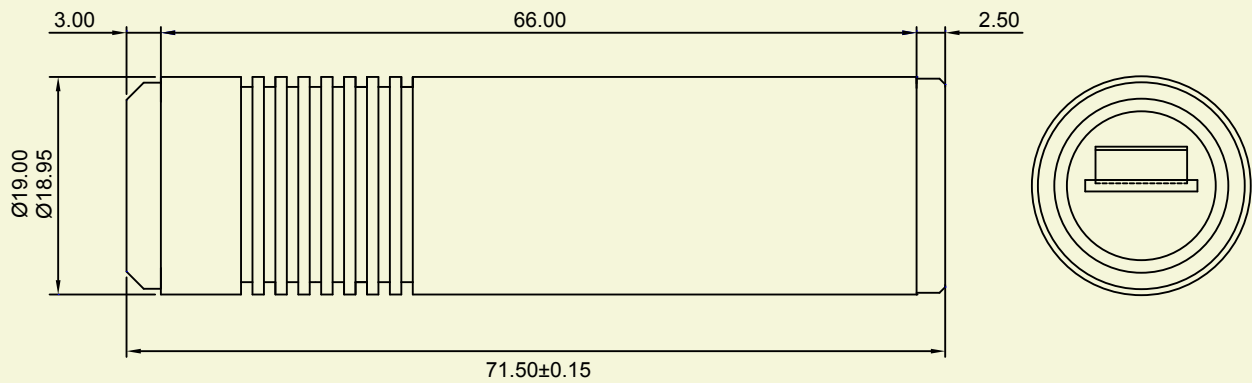
**W: [www.globalasertech.com](http://www.globalasertech.com)**

## 11.0 Software Disclaimer

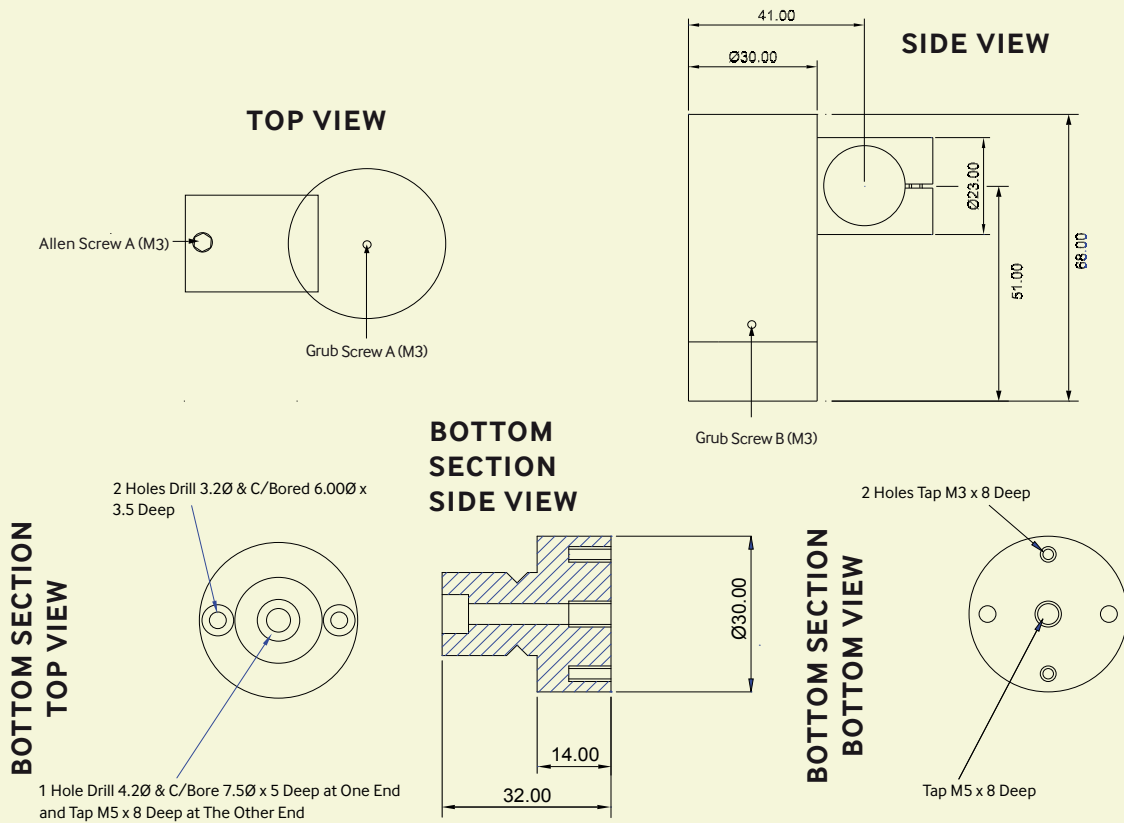
Global Laser Ltd assumes no responsibility for anything that may happen as a result of using this software.

# 12.0 Mechanical Drawings

## 12.1 DCLM Lyte-MV Outline



## 12.2 Heavy Duty Mounting Clamp Outline



# Notes.

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



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