

# OPERATIONS MANUAL

## *ML8-5RG*

## *ML8-50RG*



### **WARNING**

**READ AND FOLLOW ALL INSTRUCTIONS  
CAREFULLY BEFORE OPERATING  
THE LASER PROJECTION SYSTEM**



**Use of controls or adjustments  
or performance of procedures  
other than those specified herein  
may cause hazardous radiation exposure.**

21 CFR 1040.10 (h) (iv) CDRH





## **CAUTION**

**Be sure to follow all safety and operation instructions before using this system.**

## **Introduction**

Congratulations on your purchase of the Mobolazer Laser Projection System. Your new laser is a full-scale, multi-color laser light projection system harnessed into a compact, air-cooled, low maintenance unit. The Mobolazer Laser Projection System has 8 beam apertures that can be expanded by adding a variety of effect modules. This system uses high quality dichroic optics to minimize light losses. The system is compatible with most DMX-512 controllers that have 12 available channels.

Easy to use, the system sets up in approximately 30 minutes and can be mounted to a standard lighting truss.

Special effects are produced by modular accessories that attach to the apertures located on top of the projection rail. A variety of Mobolazer beam-effect modules can be attached to offer a seemingly endless array of mix-and-match effects.

The system plugs into any standard household outlet with supplied adapter. The CDRH-certified system is compatible with all Mobolazer accessories including the Mobolazer G-Scan graphics system. When combined with the optional G-Scan, the new blanking disengage feature produces brilliant colored scanning effects.

Mobolazer has manufactured your laser projection system to bring you years of use. Similarly, your owner's guide has been designed with easy-to-follow explanations and directions. Please read all of the instructions regarding your Mobolazer Laser Projection System and retain this manual for future reference.

Thank you for selecting Mobolazer, Inc.



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### **CAUTION**

Be sure to follow all safety and operation instructions before using this system.



**DANGER**  
Avoid direct exposure to laser beam.



# 1. Safety Considerations

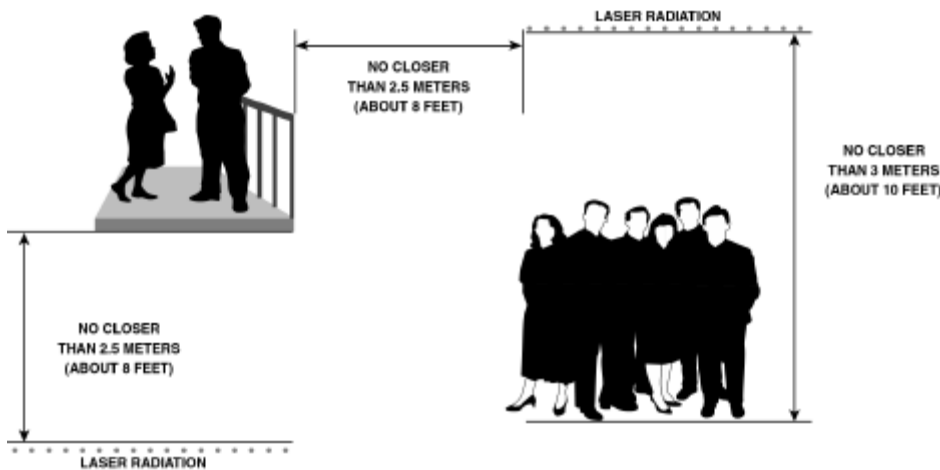
**PLEASE READ ALL INSTRUCTIONS CAREFULLY REGARDING THE SET-UP AND USE OF YOUR MOBOLAZER LASER PROJECTION SYSTEM. FOLLOW ALL WARNINGS AND INSTRUCTIONS.**

- 1 **Follow Instructions**  
All set-up and operating instructions should be followed carefully for safe operation of your laser system.
- 2 **Power Source**  
This projection system should be operated only from the type of power source indicated on the power supply of the laser. If you are not sure of the power at your location, consult an electrician or your local power company.
- 3 **Grounding And Polarization**  
This system is equipped with a polarized alternating-current line plug. This plug will fit into the power outlet only one way. This is a safety feature. Never bypass any grounding connections on the unit---electric shock may result.
- 4 **Overloading Circuits**  
Do not overload wall outlets and extension cords as this may result in a risk of fire or electrical shock.
- 5 **Object And Liquid Entry**  
Never push objects through openings on the projection system as they may touch dangerous voltage points or short-out parts that could result in a fire or electrical shock. Do not spill liquids of any kind on or into the projection system.
- 6 **Servicing**  
Do not attempt to service this projection system yourself as opening or removing covers may expose you to dangerous voltage or laser radiation and voids warranty. Refer all servicing to Mobolazer qualified technicians.
- 7 **Damage Requiring Service**  
Unplug the projection system from the outlet and refer servicing to Mobolazer qualified service personnel under the following conditions:
  - \* When the power-supply cord or plug is damaged.
  - \* If liquid has been spilled or objects have fallen into the projection system.
  - \* If the projection system has been exposed to rain or water.
  - \* If the projection system does not operate normally by following the operations instructions. Adjust only those controls that are covered in the operating instructions. An improper adjustment of other controls may result in damage and will often require extensive work by a qualified technician to restore the system to its normal operation.
  - \* If the projection system has been dropped or the housing has been damaged.
  - \* When the projection system exhibits a distinct change in performance - this indicates a need for service.
- 8 **Power-Cord Protection**  
Power-supply cords should be routed so that they are not likely to be walked on or pinched by items placed upon them or against them, paying particular attention to cords at outlets, convenience receptacles, and the point where they exit the projection system.
- 9 **Beam Modules**  
Do not alter the beam effect modules in any way. Do not insert any diffraction unit that is not recommended by Mobolazer into the beam aperture path.
- 10 **Placement Of The Unit**  
Place the unit in an area of the ceiling where the temperature does not exceed 84 degrees F. Temperatures above this have been found to cause the laser's performance to degrade. Install the unit as instructed on a lighting truss capable of handling the additional weight of the projection system, or use the mounting yoke to install the unit on a support beam. Make sure the unit and all accessories are securely fastened so the system does not fall causing injury.
- 11 **Ventilation**  
Slots and openings in the unit housing are provided for ventilation to protect it from overheating and to ensure reliable operation of the projector system. To ensure longevity of the projection system, these openings must not be blocked or covered.
- 12 **Laser Precautions**  
If exposed, the laser's short wavelength poses **EXTREME HAZARDS**, even at great distances:
  - \* **Never** expose eyes by looking directly into the laser beam.
  - \* **Never** use eyes to align or orient the beam by looking into its source.
  - \* **Avoid** exposure to direct or collateral radiation from the laser.
  - \* Make sure that **ALL** warning labels are in place and easily seen.

### 13 Laser Safety

There are several regulations that must be followed when using a laser projection system. Under FDA regulations, any laser system emitting above 1mW must be no closer than 3 meters ( about 10 feet ) above or 2.5 meters ( about 8 feet ) on the sides or below the floor ( such as through a catwalk or grated dance floor ) where an audience would be, and must be under continuous control by a qualified operator. If the system is not under continuous control, double these safety guidelines to comply with FDA standards. Exercise common sense. If you consider the laser beams to be somewhat like a firearm ( the bullet synonymous with the laser beam path ), then it should not be difficult to eliminate the chance of accidental human exposure to laser radiation.

Always have an operator present to monitor the safety of the laser projection system. In the unlikely event of a bounce mirror slipping, or a stray beam projecting into an area where human exposure may occur, the operator must immediately shut down the system and correct the problem before continuing with the operation of the laser projection system. Extreme caution must be taken to insure that proper safety procedures are used by the operator during set-up and while the laser projection system is in use. Insure that all beams are terminated in a safe location, and avoid physical contact with the laser beams.



## 2. Unpacking The Laser Projection System

As you unpack your new laser projection system make sure that all parts are included and are not damaged. ( See packing slip for list of shipped items )\*

A few suggestions:

- 1 Be sure to save the box in which your projection system was shipped. Also save the packing material. In the unlikely event your new projection system must be returned to Mobolazer, it should be transported in it's original box.
- 2 Before you hook up the system, please take a few minutes to:
  - \* Complete the registration card and send it back to us immediately.
  - \* File your sales receipt in a safe place.
  - \* Write down the serial number and keep it in a safe place for future reference.

Now that you have unpacked your Mobolazer Laser Projection System and read through the safety information, it's time to become familiar with the system.

*\*Mobolazer is not responsible for damage, insufficient parts or failure not reported within 48 hours of receipt.*



**DANGER**  
Avoid direct exposure to laser beam.

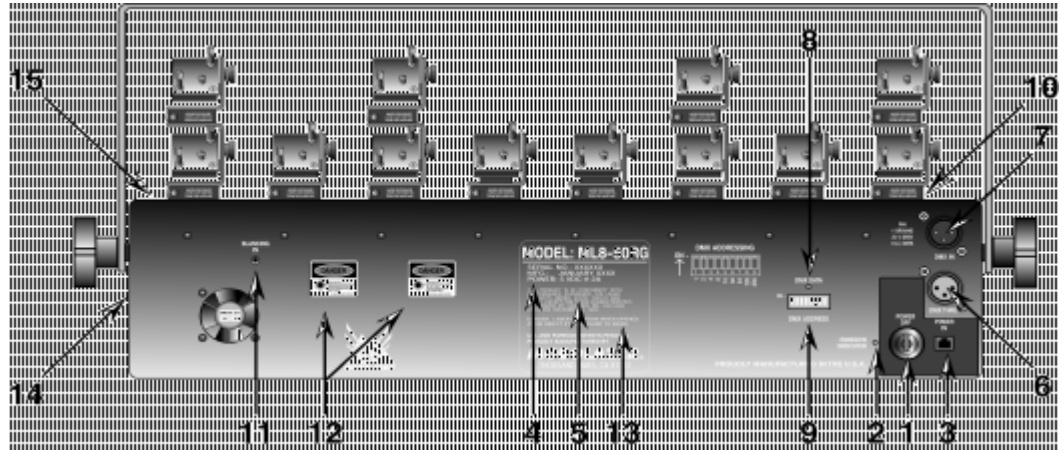
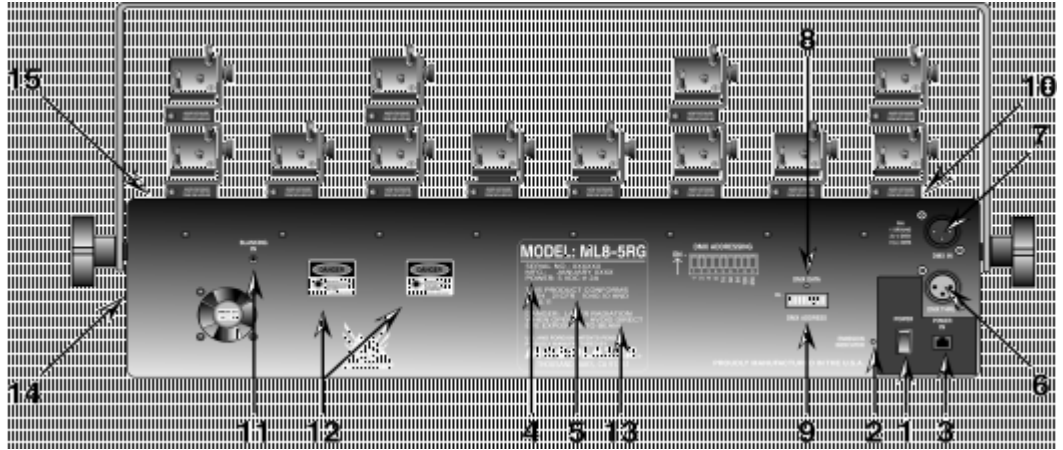




### CAUTION

Be sure to follow all safety and operation instructions before using this system.

## 3. Getting To Know The Laser Projection System





- 1 **Power Switch** - When activated this switch supplies power to the laser system. The ML8-50RG uses a key switch to activate the laser projection system.
- 2 **Emission Indicator LED** - Glows red to indicate that the power switch is engaged and the laser is energized.
- 3 **Power In** - Mobolazer supplied power pack plugs into this receptacle. Use only the correct power supply to avoid damage to the laser projection system. The correct input voltage is 5vDC, with 2A of current. Please make sure the correct adapter configuration is used.
- 4 **Identification, Serial Number And Manufacture Date Label** - Identifies model number, date that the unit was manufactured, as well as it's own unique serial number which is needed for the warranty ( removing this label voids warranty ). See **Labeling Requirements** for more information.
- 5 **CDRH Conformance Label** - Indicates that the Mobolazer Laser Projection System complies with the CDRH ( Center for Device and Radiological Health ) requirements governing laser products manufactured in the United States. See **Labeling Requirements** for more information. ( Note that the ML8-20GX is not compliant, and is for export use only. )
- 6 **DMX Thru** - Allows another Mobolazer Laser Projection System or other DMX-512 devices to be daisy chained via three pin XLR cables. See **Technical Specifications** for pin configuration.
- 7 **DMX In** - Optically isolated, three-pin DMX input allows for standard DMX-512 data to operate the laser projection system. See **Technical Specifications** for pin configuration.
- 8 **DMX Data LED** - A green glow indicates that DMX-512 signal is present.
- 9 **DMX Address Select** - Allows user to select DMX-512 address for the Mobolazer Laser Projection System. The address is set in Binary with the right most switch as MSB and the left most switch being the LSB. See **DMX-512 Addressing** for more information.
- 10 **Beam Apertures** - Laser beams are emitted from these windows, located on the projector rail.
- 11 **Blanking In** - Allows the laser to be modulated by an external +5v signal and is primarily intended for the Mobolazer G-Scan Scanning System.
- 12 **Classification Label** - Specifies the type of lasers and power. See **Labeling Requirements** for more information.
- 13 **Non-Interlock Label** - CDRH required non-interlock label. Exposure to laser light may occur if panels are removed. See **Labeling Requirements** for more information.
- 14 **Laser Collimating Adjustments** - Allows alignment of the green laser to correctly combine with the red laser. See **Laser Beam Alignment Procedures** for more information.
- 15 **Projector Rail Adjustments** - Allows alignment of the combined laser beams to the beam apertures. See **Laser Beam Alignment Procedures** for more information.



**CAUTION**

**Be sure to follow all safety and operation instructions before using this system.**

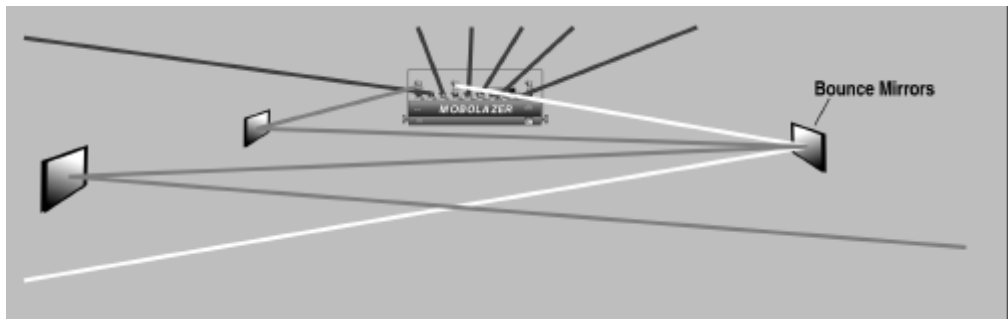


**DANGER**  
Avoid direct  
exposure to  
laser beam.

## 4. Mounting The Laser Projection System

To determine the final performance location of your laser projection system, it is necessary to understand the laser and how it functions. Your Mobolazer Laser Projections System incorporates a Class IIIa, or higher, air-cooled diode, argon or semiconductor laser. Laser light is a narrow and intense beam of light. For a laser beam to be seen, there must be some particles in the air to reflect the light, making the beams visible. ( For example - smoke or haze. ) However, you must be aware that a high volume of particles in the air will scatter the light shaft making it a diffused light source not unlike an incandescent lighting effect. Therefore, if you have smoke effect generators it would be best to wait a few minutes for the smoke to dissipate before you activate the laser light show.

Finding the best placement for the laser projection system and associated mirrors is critical in maximizing the enjoyment of the laser show. To extend the life of the laser unit, the system should be located in an area with at least 12 inches of ventilation space and have adequate air flow. Preferably the system should be located in an area where maximum visibility can be attained. You should be able to see the laser from every corner of your site. The longer the beams can travel, the more the laser is visible to you spectators. The laser should be considered the centerpiece of your lighting effects. To take advantage of this, it would be best to mount the unit in the center of attention, like at the front-center edge of the dance floor, with bounce mirrors high around the corners of the show area.



Once you have decided where the safest ( see **Safety Considerations** ) and most advantageous location to place the laser projection system, you can then mount the system. This can be done in several ways.

If you have a lighting truss that can support the additional load of the laser projection system, you can mount the system to your truss with standard c-clamps..

The projection system can also be mounted onto non-truss systems through the 1/2" mounting holes on the systems yoke. Secure mounting of the system can also be done easily and inexpensively using components sold in any local hardware store. If you have questions about the safety of the installation, please contact a local contractor or professional for advise or suggestions.

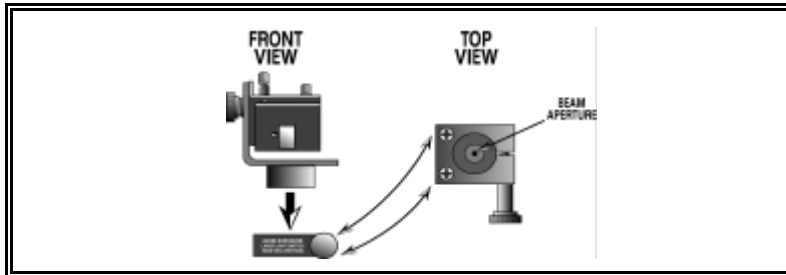
Make sure that the laser projection system is mounted securely and that it will not come loose and thereby cause a safety hazard. Use of safety hardware ( including safety cables ) is strongly recommended. After the system is mounted in its permanent location, install cables for DMX-512 control and power.



## 5. Setting Up The Beam Aperture Modules

### Installation And Removal Of Beam Aperture Modules

- 1 Make sure the laser projection system power switch is turned off
- 2 Insert the modules as shown in the drawing below.
- 3 Tighten the aperture block thumb screws on the projector rail until secure.
- 4 To remove, loosen the thumb screws on the projector rail and pull the modules out.



### Adjustment Of Beam Aperture Modules

After the laser projection system has been mounted, the beam modules need to be aligned. A standard procedure is as follows:

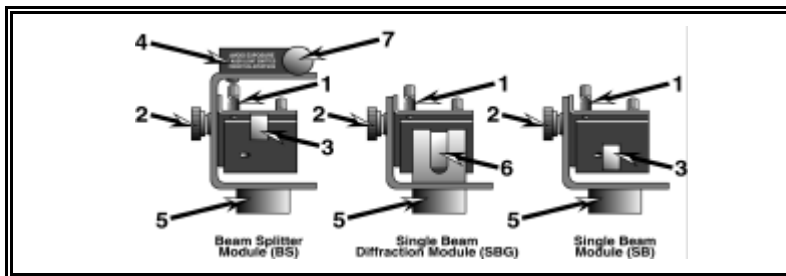
- 1 Before any beam channels are activated ( via DMX-512 ) loosen the **Vertical Adjustment Thumb Screws ( 2 )** on the side of each module.
- 2 Adjust all the **Dichroic Mirror Mounts ( 3 )** so that the beam will be directed to a safe location. ( Pointing the mounts towards the ceiling is usually the safest direction. )
- 3 Turn on the power switch of the laser projection system.
- 4 Bring up the desired channel, via DMX-512. ( For more information see **DMX-512 Addressing.** )
- 5 Lower the **Dichroic Mirror Mount ( 3 )** towards it's target. ( With **Beam Splitter Modules** start with the bottom mirror mount, and after all the adjustments have been made, then adjust the top **Single Beam Module.** )

### Horizontal Beam Alignment

- 6 Loosen the aperture block thumb screw on the projector rail.
- 7 Adjust the beam's horizontal direction by turning the module in the aperture block.
- 8 Tighten aperture block thumb screw.

### Vertical Beam Alignment

- 9 Begin vertical alignment by loosening the **Vertical Adjustment Thumb Screw ( 2 )**.
- 10 Move the **Dichroic Mirror Mount ( 3 )** vertically until the beam is on target.
- 11 Tighten the **Vertical Adjustment Thumb Screw ( 2 )**.
- 12 To fine tune the alignment, use the **Fine Adjustment Thumb Screws ( 1 )** to bring the beam to it's final target.



### Beam Effect Module

1. Fine Adjustment Thumb Screws
2. Vertical Adjustment Thumb Screw
3. Dichroic Mirror
4. Aperture Block ( Beam Splitter Module Only )
5. Hub
6. Diffraction Grating ( Single Beam Diffraction Module Only )
7. Horizontal Adjust Thumb Screw





**DANGER**

Avoid direct exposure to laser beam.

## 6. DMX-512 Addressing

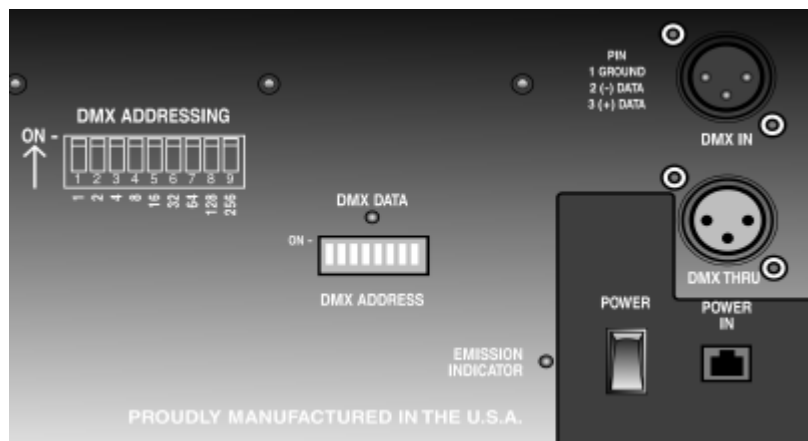
The dip-switches located on the back of your laser projection system ( see drawing below ) allow you to set the first DMX-512 channel from which your system will respond to a DMX-512 controller. Please note that your system requires 12 channels of DMX-512. ( See table below. ) Setting the unit to DMX-512 channel 1 means that the system will use DMX-512 channels 1 to 12 for operation. The systems starting channel number is selected by switching ON one or more of the nine dip-switches. Each switch that is turned ON is assigned a binary value. These values are listed on the back of the projector and in the table below. Each switch that is OFF is assigned a value of 0. The DMX-512 starting channel is then determined by adding the values of switches 1 to 9. ( See example below. ) For DMX-512 pin configuration, see **Technical Specifications**.

DMX-512 Control	DMX-512 Values	Mobilazer ML8-5RG System Response	Mobilazer ML8-50RG System Response
1	0-255	Aperture 1 Intensity 0-100% (Furthest Left)	Aperture 1 Intensity 0-100% (Furthest Left)
2	0-255	Aperture 2 Intensity 0-100%	Aperture 2 Intensity 0-100%
3	0-255	Aperture 3 Intensity 0-100%	Aperture 3 Intensity 0-100%
4	0-255	Aperture 4 Intensity 0-100%	Aperture 4 Intensity 0-100%
5	0-255	Aperture 5 Intensity 0-100%	Aperture 5 Intensity 0-100%
6	0-255	Aperture 6 Intensity 0-100%	Aperture 6 Intensity 0-100%
7	0-255	Aperture 7 Intensity 0-100%	Aperture 7 Intensity 0-100%
8	0-255	Aperture 8 Intensity 0-100% (Furthest Right)	Aperture 8 Intensity 0-100% (Furthest Right)
9	0-255	Color Mixing From Green To Red 0-100%	Red Laser Intensity 0-100%
10	0-255	Main Laser Intensity 0-100%	Green Laser Intensity 0-100%
11	128-255	Disengage G-Scan Blanking Of Red Laser	Disengage G-Scan Blanking Of Red Laser
12	128-255	Disengage G-Scan Blanking Of Green Laser	Disengage G-Scan Blanking Of Green Laser

Dip Switch	DMX-512 Binary Value
1	1
2	2
3	4
4	8
5	16
6	32
7	64
8	128
9	256

### DMX-512 Address Examples

DMX-512 Control Address	System Dip Switches ON	Binary Values
7	1, 2, 3	1 + 2 + 4 = 7
50	2, 5, 6	2 + 16 + 32 = 50
198	2, 3, 7, 8	2 + 4 + 64 + 128 = 198



## 7. Service And Maintenance

It is important to maintain your Mobolazer Laser Projection System in proper operating condition to optimize the life of the laser. It is also important to preform regular checks of the system's cleanliness and ventilation.

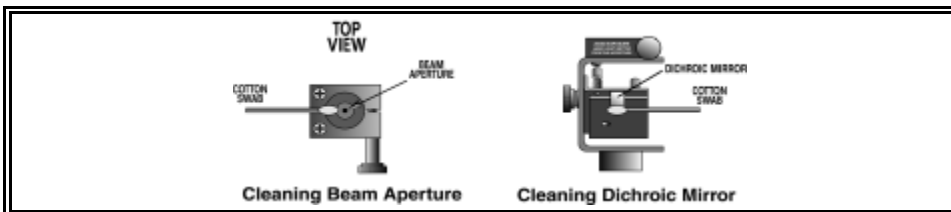
### Cleaning The Projection System

- 1 Make sure the laser projection system is turned off.
- 2 Make sure that all ventilation holes and fans are clear of any obstructions such as lint or dirt.
- 3 Wipe down the system with a damp cloth. If you experience greasy residue or smoke deposits, spray a clean cloth with a solvent such as glass cleaner and wipe down the unit. Be careful not to spill any liquids into the system.

### Cleaning Beam Aperture And Dichroic Mirrors

Now that the projector system has been wiped down, obtain an ample supply of cotton swabs and glass cleaner. These supplies will be necessary for cleaning the small dichroic mirrors on the beam modules and the aperture windows on the projector rail. Here are the steps to clean them:

- 1 Remove all modules. ( See **Setting Up The Beam Aperture Modules.** )
- 2 Saturate a cotton swab with glass cleaner and clean the beam aperture window as illustrated below. A clean aperture window ensures proper passage of the laser beam and full intensity of the system.
- 3 Apply glass cleaner to the end of a cotton swab, and shake off any excess. **NOTE: Be very careful when cleaning the dichroic mirrors as they are very fragile and can break off easily and are not covered by the warranty.**  
With an up and down motion, use one cotton swab for every mirror. Clean the upper mirror first, then the lower mirror. This will ensure that if any dust has settled on the lower mirror, from the cleaning of the upper mirror, it is cleaned off.
- 4 When cleaning diffraction modules, use distilled water on the inside of the diffraction grating and glass cleaner on the outside of the diffraction grating. Using anything other than distilled water on the inside of the diffraction grating will cause damage to the delicate coating.
- 5 Reinstall all modules. ( See **Setting Up The Beam Aperture Modules.** )
- 6 Realign all modules. ( See **Setting Up The Beam Aperture Modules.** )



### Cleaning Bounce And Diffraction Mirrors

Using a soft cloth or soft paper towel, spray with glass cleaner, and **VERY CAREFULLY** wipe the mirrors clean. Be careful not to move the mirrors out of alignment nor to damage them when cleaning as they are not covered under warranty.

**Check the laser projection system frequently. Immediately replace any broken parts, keep all optical components clean, check all cables and strain relief's regularly.**

At Mobolazer we take pride in the durability and reliability of our products. A great deal of emphasis has been placed on controlled manufacturing methods and on quality control throughout the manufacturing process. Despite this fact, occasionally projectors break down in operation. We feel that our units have a favorable service record and highly economical prices when compared to other competitors. We hope to demonstrate in the long run, that we always provide the customer with above average service, quality and turn around time. We not only want to ease your economic burden, but also make our facilities available to get your system operating again in the shortest amount of time possible. If you have any questions please feel free to contact us.





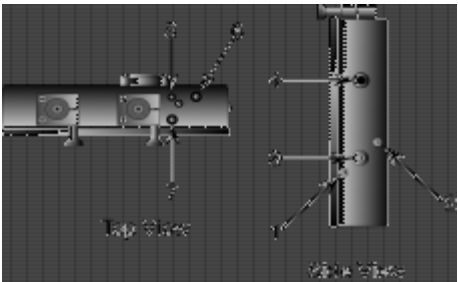
**DANGER**  
Avoid direct eye exposure to laser beam.



## 8. Laser Beam Alignment Procedures

Your Mobolazer Laser Projection System is shipped pre-aligned from the factory and should not require any adjustments. However, during transport some alignments may come out of adjustment. To re-align your system, use the following procedures. ( Make sure to follow all **Laser Safety Precautions.** )

- 1 Remove Beam Aperture Modules from apertures 1 and 8. For more information, see **Setting Up The Beam Aperture Modules.**
- 2 Position the system so that the beams will terminate onto a safe location. A smooth, non-reflective surface is ideal. For the Laser Collimating Adjustments the further the surface, the more accurate the adjustments will be.  
**Laser Collimating Adjustments**
- 3 Via DMX-512, open apertures 1 and 8. Adjust the color controls to a visually equal red and green intensity.
- 4 If the beams **DO NOT** overlap, use the supplied 5/32" Allen wrench to adjust the green beam to overlap the red. ( **1 & 2** ) Be careful to make only small adjustments, over adjusting could cause internal damage or total loss of the green beam output. The correct adjustment should produce a yellow-ish beam.  
**Projector Rail Adjustments**
- 5 If the beams **ARE NOT** centered in the beam apertures, use the supplied 5/32" Allen wrench to adjust the **Collimated Beam** to the center of the apertures. ( **6 & 7** ) Be careful to make only small adjustments, over adjusting could cause internal damage or total loss of the **Collimated Beam.**



### **Laser Collimating Adjustments**

- 1 Green Laser Adjustment-Front To Back Of Aperture
  - 2 Green Laser Adjustment-Side To Side Of Aperture
  - 3 Manufacture Anchor Point-**Not Used For Alignment**
  - 4 System Yoke Anchor Point-**Not Used For Alignment**
- ### **Projector Rail Adjustments**
- 5 Manufacture Anchor Point-**Not Used For Alignment**
  - 6 Adjustment Of Collimated Beam-Side To Side Of Aperture
  - 7 Adjustment Of Collimated Beam-Front To Back Of Aperture

## 9. Technical Specifications

### **ML8 - 5RG RG-Beam**

8 - Beam apertures with 5mW of laser output  
Global color mixing ( red to green color spectrum )  
G-Scan compatible  
Multi-color blanking with optional G-Scan  
DMX-512 Controllable  
Linear/multiple beam control  
12 - Channels DMX-512  
Optically isolated DMX-512 interface

ML8 Series modules included  
6 - Single beam  
4 - Beam splitters  
2 - Diffraction beam

Full compliance with US, FDA, & CDRH requirements  
CE Certified  
Patent pending  
Power supply  
Input - 100-240V/50-60hz  
Output to system - 5vDC/2A  
Dimensions - 24.5" w x 1.75" d x 10" h  
Weight - 7 Lbs.

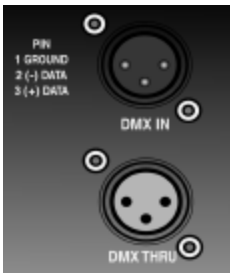
### **ML8 - 50RG RG-Beam**

8 - Beam apertures with 50mW of laser output  
Global color mixing ( red to green color spectrum )  
G-Scan compatible  
Multi-color blanking with optional G-Scan  
DMX-512 Controllable  
Linear/multiple beam control  
12 - Channels DMX-512  
Optically isolated DMX-512 interface

ML8 Series modules included  
6 - Single beam  
4 - Beam splitters  
2 - Diffraction beam

Full compliance with US, FDA, & CDRH requirements  
CE Certified  
Patent pending  
Power supply  
Input - 100-240V/50-60hz  
Output to system - 5vDC/2A  
Dimensions - 24.5" w x 1.75" d x 10" h  
Weight - 7 Lbs.

### **DMX-512 Pin Configuration**



Pin	Functions
1	Ground
2	( - ) Data
3	( + ) Data

# 10. Labeling Requirements

## ML8-5RG RG-Beam

## ML8-50RG RG-Beam



### Located On Rear Of Projector



#### Laser System Identification

1010.3 CDRH

#### CDRH Conformance Certification

1011.2 CDRH

#### CDRH Non-Interlock Warning

1040.10 (g) (4) CDRH



### Located On Rear Of Projector



#### Laser Classification Warning

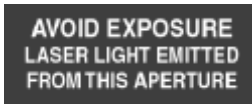
1040.10 (g) (1) (I) CDRH

#### Statement of Maximum Output

1040.10 (g) (4) CDRH

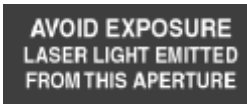


### Located On Top Of Projector Rail & On Top Of Beam Splitter Module



#### Aperture Warning Label

1040.10 (g) (5) CDRH





## 11. ML8-50RG Addendum

**NOTE:** This section is only intended for the users of the **ML8-50RG Laser Projector Systems**.

### CDRH Quality Control Program

Part of the responsibility of a laser show manufacturer/producer is to insure that the laser effects remain within the configuration described in the **CDRH Variance-Light Show Report**, which is the laser light show **Quality Control Program**.

The program requires that the manufacturer/producer be prepared to establish show safety status at all times. Two major items are required to accomplish this. The first is a daily checklist, which verifies that all elements of the projection system, and the effects, required for certification, are in order. A sample **Light Show Checklist** is included in this section. The second item required is a set of quality control documents and records, some of which must be available at the operators' station at all times.

The documentation, which the operator should have available at all times, includes the following items:

- 1) A written description of laser safety and quality control procedures. ( For example, a copy of this document. )
- 2) A copy of the current variance under which the show is being operated, Note that variances whose status is not current nor approved are not acceptable.
- 3) Copies of any state or local laser safety license or permits.
- 4) A copy of any quality control documentation or checklist for the laser projection system. ( A copy of the **Pre-Performance Checklist**. )
- 5) A copy of the quality control checklist for the laser light show itself. ( A copy of the **Laser Show Checklist**. )
- 6) A copy of any written procedure for operation of the laser projection system, especially instructions for completion of the show quality control checklist. ( A copy of this **Operations Manual**. )
- 7) Copies of accident reporting forms and procedures. ( A copy was sent with your variance application. )
- 8) Copies of the communications sent to regulatory officials to notify them of the production. ( An example of **Show Notifications** was sent with your variance application. )

Quality control records which should be kept available for inspection, but which need not be on hand at all times, are the completed daily light show checklist, copies of all reports filed describing the production, and copies of other related communications with regulatory agencies.

Keeping the operators Quality Control Manual and the quality control records current and organized is essential to establish that the show is conducted in compliance with safety regulations, and the conditions of the operating variance.

## Laser Show Checklist



All items must be brought to a satisfactory state before being checked off

### A. **IDENTIFICATION**

1. Name of show :
2. Location of show :
3. Date(s) and time(s) of show :
4. Operator responsible for safety of show :
5. Manufacturer of the laser show projector / display device:  
MOBOLAZER, Inc.  
790 Hampshire Road, Unit D  
Thousand Oaks, California 91361  
(805) 230-2166  
Model: \_\_\_\_\_ Serial Number: \_\_\_\_\_

### B. **EQUIPMENT CHECKS**

1. Are all protective housings in place with tight fit?
2. Is the projector secured rigidly in place?
3. Before activating the laser, check that all beam shutters are operable and are left in the closed positions.
4. Make sure that the laser cannot be energized without the key and that the key removal terminates operation.
5. Check that all accessory optics such as mirrors and targets are secured firmly in place.
6. Energize the laser at the lowest possible power (without allowing the laser light to emerge and with shutters closed).
7. Confirm that all emission indicators and the emission delay operated properly.
8. Verify that all required labels are in place and visible on the projector. For locations, please see **Labeling Requirements**.
  - ( ) Laser System Identification
  - ( ) CDRH Conformance Certification
  - ( ) CDRH Non-Interlock Warning
  - ( ) Laser Classification Warning and Statement of Maximum Output
  - ( ) Aperture Warning Labels

### C. **ALIGNMENT CHECKS**

1. Evacuate all but essential personnel from facility. These checks must be performed with no audience present.
2. Make sure you have visual control of the entire projection space from your operating location (especially the audience space) and that areas are adequately secured (see the current ANSI Z136.1 standard for guidance).
3. Operate the laser at the lowest possible power, open shutters, and perform alignments.
4. Perform physical survey to confirm that beams exceeding 1mW will be separated from the audience by the minimum distances required. (In general, for shows under operator control, a 3 meter vertical separation and a 2.5 meter horizontal separation from audience locations are required. For shows not under continuous operator control, a 6 meter vertical and 2.5 meter horizontal separation would be required.) See **Safety Considerations** for more information.





5. Review your proposed projections with venue management to be certain that the audience will not be permitted access to locations resulting in a violation of item 4 above.
6. Operate the projector at the power required by the show, making sure that there are no spurious projections into unintended areas and that the conditions of item 4 above are maintained. Determine and record the power levels in accordance with the levels reported in Part 9 of your CDRH Laser Light Show Report.
7. Confirm that all projectors and optics are rigidly secured and cannot be disturbed during subsequent operations or during the show itself.
8. Check for operation and proper setting of all devices related to safety, including:
  - ( ) beam blocks
  - ( ) scanning safeguards
  - ( ) emergency stop controls
9. Maintain continuous surveillance of the projectors and all optics between the time of alignment and the show to be certain that the alignment of the projector and optics is not disturbed.

**D. MEASUREMENT / PARAMETRIC CHECKS**

1. List the effects to be performed.
  - (a)
  - (b)
  - (c)
  - (d)
  - (e)
2. For each effect, give, if applicable, time duration, intended and measured power in beams, scan frequency and amplitude, and identification of measuring instrument used.
  - (a)
  - (b)
  - (c)
  - (d)
  - (e)







## 12. Warranty

### MOBOLAZER ML8 Limited Warranty

**Mobolazer, Inc. warrants that the ML8 Series Laser Projectors are shipped from the factory free from defective materials and workmanship with a limited warranty under normal use and service of three (3) years from the date of purchase. Lasers, modules, and accessories are warranted for one (1) year from the date of purchase to the original end user when purchased from an authorized Mobolazer, Inc. dealer and is not transferable. This express warranty is provided by Mobolazer Inc. 790 Hampshire Road, Unit D, Thousand Oaks, California 91361.**

THIS WARRANTY IS GIVEN IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED. INCLUDING, WITHOUT LIMITATION, IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR PARTICULAR PURPOSE. IN NO EVENT SHALL MOBOLAZER BE LIABLE FOR ANY LOSS OF USE, LOSS OF TIME, COMMERCIAL LOSS, LOST PROFITS OR SAVINGS OR OTHER INCIDENTAL, SPECIAL OR CONSEQUENTIAL DAMAGES ARISING OUT OF THE USE OR INABILITY TO USE SUCH PRODUCT, TO THE FULL EXTENT SUCH MAY BE DISCLAIMED BY LAW

**This warranty sets forth the full extent of Mobolazer, Inc. responsibilities regarding product repair or replacement as the exclusive remedy.**

In the event of a defect, malfunction, or failure to conform to specifications during the warranty period, Mobolazer, Inc., at its option, will either repair, or replace parts or boards with functionally equivalent new or reconditioned parts or boards. Replaced parts and boards are warranted for the balance of the original warranty period. All parts and boards removed in the replacement process shall become the property of Mobolazer, Inc. Transportation charges to and from an authorized dealer or the Mobolazer factory for repair shall be the responsibility of the owner. All products returned to Mobolazer, Inc. must have a factory return authorization number (RA) for return prior to shipping. For further information and special shipping instructions, please call (805) 230-2166.

This warranty does not cover defects, malfunctions, performance failures or damage to the unit resulting from use in other than normal and customary manner, misuse, accident or neglect, the use of non-conforming parts, or improper alterations or repairs. This warranty does not cover wear and tear on covers, housings, items such as knobs, jacks and switches, and optical components including mirrors, diffraction gratings, and windows.

WARRANTY WILL BE VOID IF ANY OF THE FOLLOWING CONDITIONS OCCUR:

- Projectors that are incomplete such as those in which boards or components are missing and/ or incompatible
- Projectors whose serial numbers have been removed, altered or do not match with the laser with which it was manufactured.
- Projectors that have been opened by, or had work performed by anyone other than an authorized Mobolazer service center.
- Projectors received with non-conforming or non-Mobolazer housings or parts.
- Projectors with an extreme accumulation of fog or haze fluid build up.

The purchaser is responsible for completing and mailing to Mobolazer, Inc. within fifteen (15) days of purchase the warranty registration card enclosed with each product.

SOME STATES DO NOT ALLOW THE EXCLUSION OR LIMITATION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES, OR LIMITATION ON HOW LONG AN IMPLIED WARRANTY LASTS, THEREFORE THE ABOVE LIMITATIONS OR EXCLUSIONS MAY NOT APPLY. This warranty gives you specific legal rights and you may have other rights, which vary, from state to state.