X-LASER USA

WELCOME: PLEASE READ THIS FIRST.

If you require this document in another language, please contact us.

First and foremost we would like to thank you for purchasing an X-Laser Next Generation Laser Performance System. We hope that you find many occasions to use your new laser system and that you experience unparalleled success with each.

On this DVD, we have provided for you an exceptional amount of information to help you use your new X-Laser system easily and safely. X-Lasers are unusually powerful laser display devices which are designed for professional use only. The power of our laser systems will allow you to use your new X-Laser in situations where older, weaker lasers would just have been ineffective. We've been there. However, the power of this unit also requires additional safety measures both for you, your staff, and your audience. Please make a note of and adhere to the following before turning on your new X-Laser system.

1. Read the user manual included with your new X-Laser completely. It is not just the same old information that you get with every piece of gear. It is written to help you harness the power of your new X-Laser safely. That, and we spent two straight weeks writing it for your benefit so please read it.

2. Your new X-Laser is intended to be used with high quality control devices such as Quickshow XL Laser Control Software and/or a high quality DMX controller depending on your unit. In either case, reliable laser control is essential for both maintaining safety and show quality. We strongly recommend that you utilize only industry standard hardware and software to control your X-Laser (eg. we do NOT suggest using $200 DMX controllers or “bargain” ILDA software/freeware and the like).

3. Your new X-Laser must be kept climate controlled at all times. Excessive heat or cold can and will damage the laser modules, optics and adhesives and such damage is NOT covered by the warranty (and yes, we can tell). Heat and cold will also dramatically change the power output of the laser. Please refer to the "Warm Up" section of your user manual for more information on these points and general warm up time frames before use.

We wish you all the very best in your performances and many years of fun to come!

The X-Laser Team

LASER SAFETY SUGGESTIONS AT-A-GLANCE

Some of the ideas which follow are our suggestions and some are federal requirements for safe laser usage. This is not mean to be, nor is it, an exhaustive list of laser safety procedures but rather a supplemental guide to highlight a number of important points. Hopefully, this should make wading through all of the info on laser safety a little more manageable. Please see our laser setup, safety, and training videos, your User Manual and industry training resources for more information.

1. Always avoid contact and near contact with the primary and reflected laser beams. All beams should be kept at least 3 meters from anyone including your staff. People may tell you that lasers of this power are commonly shot directly at people in nightclubs and at concerts around the world. While this is partly true, it does not make it a good idea nor legal in the USA unless you have a special FDA variance to do it and are using X-Laser Polaris hardware. Use this product to shoot lasers well over the heads of a crowd and you will still get fantastic effects. Remember, it only takes one injury (real or imagined) to cause big problems for everyone.

2. Keep your approved variance with you at each and every show and follow the variance terms as closely as possible. You should always keep a physical barrier between the lasers and the audience because drunk people (and sometimes sober people) do stupid things. Be sure that the laser is securely fastened to whatever will be holding it up and actually use the pre-show checklist for every event to ensure proper operation and a safe show. If anything is not working properly or even acting "weird," err on the side of safety and do not use the laser until the problem can be addressed.

3. Be sure that someone (who is a legal and properly trained employee of the variance holder) is operating the laser at all times and can see all of the beam paths. Do not leave the laser show unattended or out of your field of view for even a moment. Always be ready and able to turn off the laser in case of emergency.

4. Educate yourself about everything having to do with lasers. Get training from the Laser Professionals Institute or join the International Laser Display Association. There is a world of information out there which will help you use your laser to ever greater effect.

5. It is possible that a laser inspector (EOS) may note certain "missing components" on your laser unit during one of their routine but infrequent inspections because of the way we have designed it. To make the lasers as easy to use and as streamlined as possible, we have completely re-worked the classic laser design that everyone else uses and certified your laser unit on that basis. However, most if not all EOS's will not be familiar with this design because as far as we know, we

are the very first to do it. If you encounter any problems, please contact us through our website and we will be glad to help you respond if they would like further comment made to the CDRH (FDA).

Please read the rest of this file for more important setup and safety information!

NOTICE FOR X-LASER USERS ABOUT EOS INSPECTIONS

Electro-Optical Specialists (EOS) are FDA inspectors trained to evaluate the safety of lasers and other radiation emitting products. A number of X-Laser users have been inspected over the past few years and we have included this note to help give you an idea of what to expect and how to answer some common questions if/when you are inspected.

1. If you are inspected, be prepared to be cited for something. Other than X-Laser users most inspections result in a citation of some kind so being prepared for that possibility is important. Almost no one does everything perfectly and it is important to know that a citation does NOT typically carry a penalty and usually only requires that you correct some deficiency which is typically safety related. The VAST majority of X-Laser users are not cited during inspections, however if you are, please know that we stand ready to help you correct whatever the issue may be.

2.If you receive a citation for anything having to do with your X-Laser projector please contact us right away and we, not you, will take care of responding to whatever issue the inspector has raised directly with the inspector or with the FDA. There are a hundred little regulations that an inspector can cite someone for most of which have already been addressed between X-Laser and the FDA... but the inspector probably was never made aware of the particulars of our compliance paperwork. We will be happy to address whatever issues they raise immediately on your behalf and we have yet to have an issue that was not resolved in a couple of days.

3. Understand that EOS personnel inspect EVERYTHING under their jurisdiction which is a lot and thus may not be fully versed in the particulars of our laser light show devices. However they are all professionals and so it is best to not argue with them and simply let us resolve issues directly because we speak their language. However, if you are inspected during an event and they request that you make adjustments to your rigging for safety purposes, please do so immediately because the way in which you have rigged the laser is one of the only areas we cannot address.

4. Certification of Training - This is a common issue raised by EOS Inspectors. Inspectors use a standardized form when inspecting laser light show devices and that form asks that the operator provide a certificate of training. Your laser light show variance requires that laser operators in your employ be properly trained and that a certificate be provided attesting to that fact. The FDA presumes that the actual variance

holder will not be the one operating the laser system and so the actual operator is required to provide a certificate of training. However, for many of our customers the variance holder is also the operator which is a situation that the form was not designed to cover.

On our User DVD there are a number of training videos and educational resources. While this is not nearly as robust as private programs who offer LSO (Laser Safety Officer) training and thus are intended only as an introduction into high powered lasers, these videos will give you the basic knowledge you need to run a laser system safely. Also included on the DVD is a certificate that you may print out and fill your name into after you have full reviewed and made sure that you understand all of the materials we have provided. This should meet the inspector's need to see a certification of basic level training and this approach has been authorized by Dale Smith at the CDRH. However, we cannot stress enough that watching the training videos we have provided is an essential element to operating lasers safety and a certificate should only be issued AFTER that process has been completed to your personal satisfaction.

X-Laser X/Y Targeting and Beam Attenuation Notes for High Powered Lasers

One feature of all Class IIIB and IV X-Lasers is that by design there are always at least two methods of attenuating the laser beam when rigged properly. Typically one method is by killing the control signal such as DMX or ILDA and typically the other method is by cutting mains power to the fixture, or in some models, either interrupting the blanking signals or closing a shutter via an Emergency Safety Stop Dongle (ESSD). An ESSD is sometimes referred to as a "big red button" which can either sit inline of the signal or power lines or attach directly to the rear of a laser to control the shutter. In any case, two redundantly fail safe methods of ceasing laser emissions is essential and should be observed at all times.

We should note that when we discuss killing mains power we are not suggesting, necessarily, that you should climb up a ladder or something to pull the power out of the back of the laser, or rip it out of a wall socket. A DMX relay pack which controls power switching does the job very nicely but of course X-Lasers DO NOT DIM BY MAINS POWER and should never be connected to a dimming circuit.

Most models of X-Lasers contain one or more galvanometer or stepper motors which are necessary to create the quick movements that make laser patterns cohesive. While galvanometers in "animation" or "graphics" lasers offer quite fine control, the X/Y movement of stepper motors is typically made in steps of several degrees. This means that while the lasers can be specifically aimed to a certain degree, some units are not intended for precise targeting of items such as secondary bounce mirrors at long distances. Graphics lasers such as the Skywriter series as well as others are more precise in this regard.

When using the Y axis control, either by ILDA or DMX, to keep the laser beams out of the audience areas, please bear in mind that the Y axis control is generally relative to the pattern you are using and the point at which you set the Y axis is typically going to be the middle of any given pattern. This control does not create a permanent boundary (ie. the laser will never cross below this point) but rather moves the center of the patterns up and down. In other words, if you have a very large pattern, the laser will move further downward and on all sides than a smaller pattern. When setting this boundary for safety reasons we recommend setting it using the largest pattern you will be using for your show which will, in effect, create a definite boundary.

To use a practical example of this, if you set your Y axis to shoot a straight horizontal line at the required 3 meters above an audience, switching then to a vertical line would place the center of the vertical line where the horizontal line had been. However, the vertical line would continue to extend above and below your Y axis point. This is also why using the included "beam blocks" is not just a good idea, but critical to ensure that no lasers spill into audience areas.

Using ILDA software control with ILDA capable lasers, you will have MUCH more control about how beams are shaped and where they will shoot. This is strongly recommended for setups which require precision or have lower ceilings.

For lasers which feature AUTO or SOUND ACTIVE modes, using the laser in these modes will in many cases effectively defeat the X/Y targeting because you are allowing the laser to design and run its' own DMX programs. Use special care in these modes and we strongly recommend running extensive tests during a show setup to ensure that these modes will not result in unwanted laser patterns or audience spill.

Please note that to make the best use of X/Y controls as well as all other DMX controls, we strongly recommend using a high quality DMX controller for the fastest and smoothest laser response.

Finally, we also note that beam attenuation (turning off the laser beam) should be made possible via two different methods during your show setup. Please read your usual manual for precise instructions but bear in mind that the lasers MAY have to be set to full manual to achieve total beam attenuation as Sound Active and Auto modes may periodically activate the laser with strong DMX control or sound inputs. You must ensure that you are able to deactivate the laser in case of emergency and thus we require all IIIB and IV laser systems to be used in DMX or ILDA mode during performances so that remote beam attenuation is possible. As an alternative, you also may use an X-Laser ESSD available from any X-Laser dealer but, in all cases, this functionality should ALWAYS be checked before beginning any performance, test, or demonstration.

SHOW SETUP PROCEDURES

On the following two pages we have included a sample list for setup, alignment and testing procedures which you may or may not wish to revise or add to depending upon

your situation. This list is intended to be overly robust so that it will encompass and apply to many different show situations. Your setup may be more complex, or far more simple and your procedures for setting up a show can and should adapt to that reality.

It is strongly recommended that if anyone other than the variance holder will be operating the laser system that a standardized company plan including operator training be made as to how the laser should be setup and used. This will allow for more effective company specific training lowering your liability and ensuring that your laser technicians will be able to put on the safest and best possible show for whatever your circumstances may be.

The second of the two pages contains a “Show Warning Sign” which is intended to notify persons at events and/or demonstrations that a high powered laser will be used. This is a requirement from the FDA for any areas where guests or staff may encounter the laser projectors or beams (think walking onto a stage from the wing and having no idea that a high powered laser is on the other side of the curtain) and perhaps the single most overlooked requirement among professional laser light show producers. It is included here for your convenience.

As always, please visit www.x-laser.com with questions or concerns so that we can help you to best use our products. Our dealers are great people but we live and breathe lasers every day and thus are best suited to answer compliance related questions.

Thanks for choosing X-Laser!

SAMPLE INITIAL START-UP / SET UP, ALIGNMENT & TEST PROCEDURES

1. Ensure all appropriate agencies have been notified
2. Ensure that all required documentation is present at show site
3. Warn other personnel in laser set up area of impending laser work, clear and secure show area of non essential personnel.
4. Hang appropriate laser area warning signage
5. Ensure all equipment is securely and rigidly mounted
6. Ensure all cables are appropriately dressed and covered to prevent tripping or other mechanical hazard
7. Perform visual inspection of laser equipment for damage and other issues
8. Preadjust laser beam blocks to safe location
9. Utilize laser safety checklist at this time
10. Remove all nonessential personnel from radiation area
11. Close doors, windows and other accesses to prevent unintended exit of laser light
12. Notify all present of imminent laser emission
13. Ensure all lasers are at minimum settings and all controls are off
14. Check operation of safety features such as shutters, attenuators, emission indicators, labels etc.
15. Be sure you are able to immediately deactivate laser if necessary
16. Check all radiation areas for safe emission condition
17. Open shutter (if applicable) and ensure proper operation of laser projection system
18. Perform alignment and aiming as necessary at lowest possible power
19. Complete safety checklist & operator's log
20. Determine minimum necessary laser emission power (if applicable)
21. Evaluate, discuss and address possible safety concerns
22. Practice, test, rehearse and demonstrate as necessary.
23. Discuss & address safety, and operation needs and concerns as appropriate
24. Check security situation for possible perturbation of equipment, lenses, etc.
25. Power off lasers, disconnect from DMX or ILDA, and store securely.
26. Ensure procedures and checklists are up to date.